

DRAFT

North Fork Coal

ENVIRONMENTAL IMPACT STATEMENT

Delta and Gunnison Counties, Colorado

September 1999



FIGURES

Lead Agencies:



USDI Bureau of Land Management



USDA Forest Service

Cooperating Agency:

USDI Office of Surface Mining Reclamation & Enforcement

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North Fork Coal

Draft

ENVIRONMENTAL IMPACT STATEMENT

September 1999



U.S. Department of the Interior
Bureau of Land Management
Colorado State Office
Uncompahgre Field Office



U.S. Department of Agriculture
Forest Service
Rocky Mountain Region
Grand Mesa, Uncompahgre
and Gunnison National Forest

Cooperating Agency: U.S. Department on the Interior
Office of Surface Mining Reclamation and Enforcement
Western Regional Coordinating Center

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H0
243
106
06775
1999
V.2

1873

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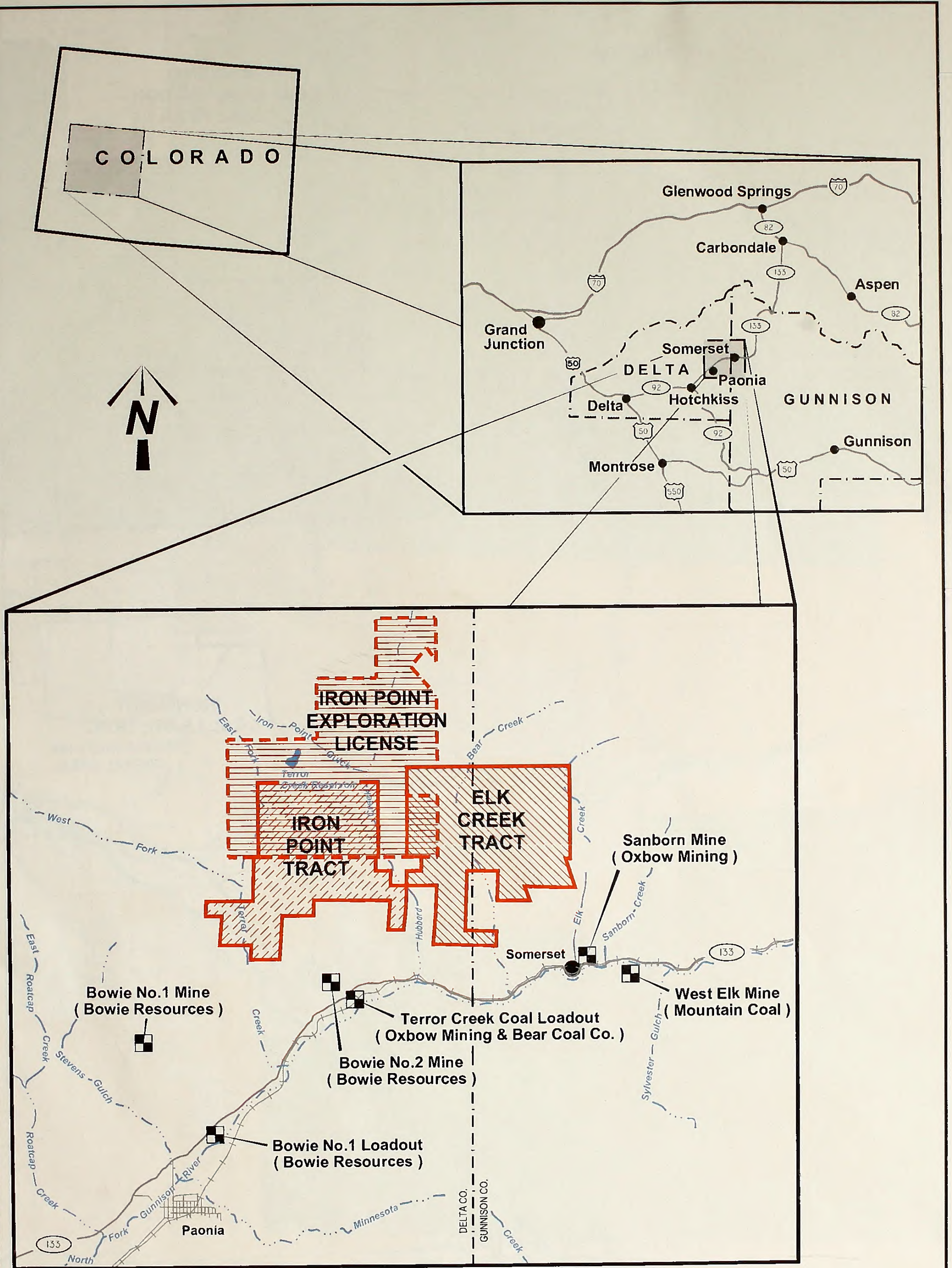
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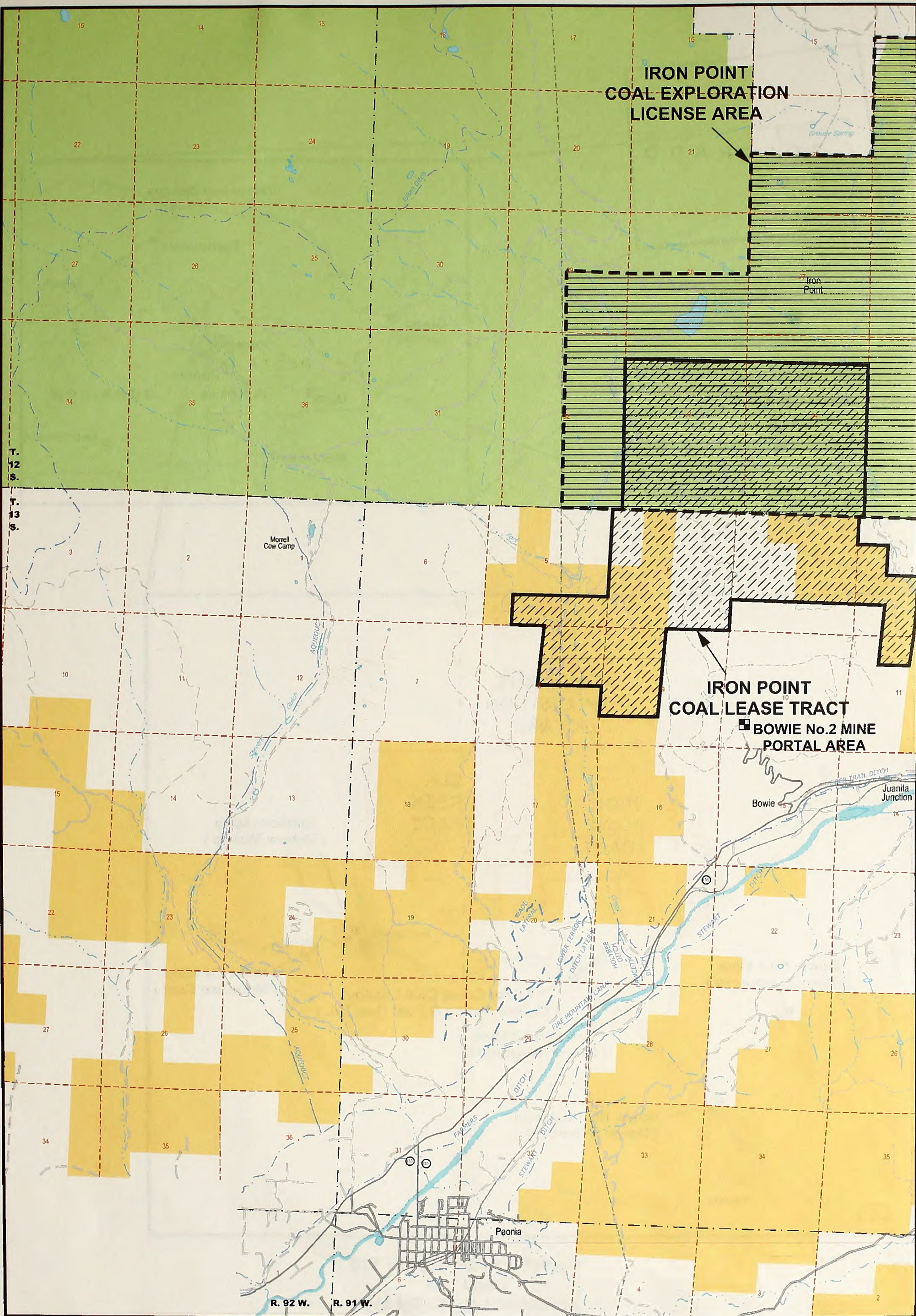
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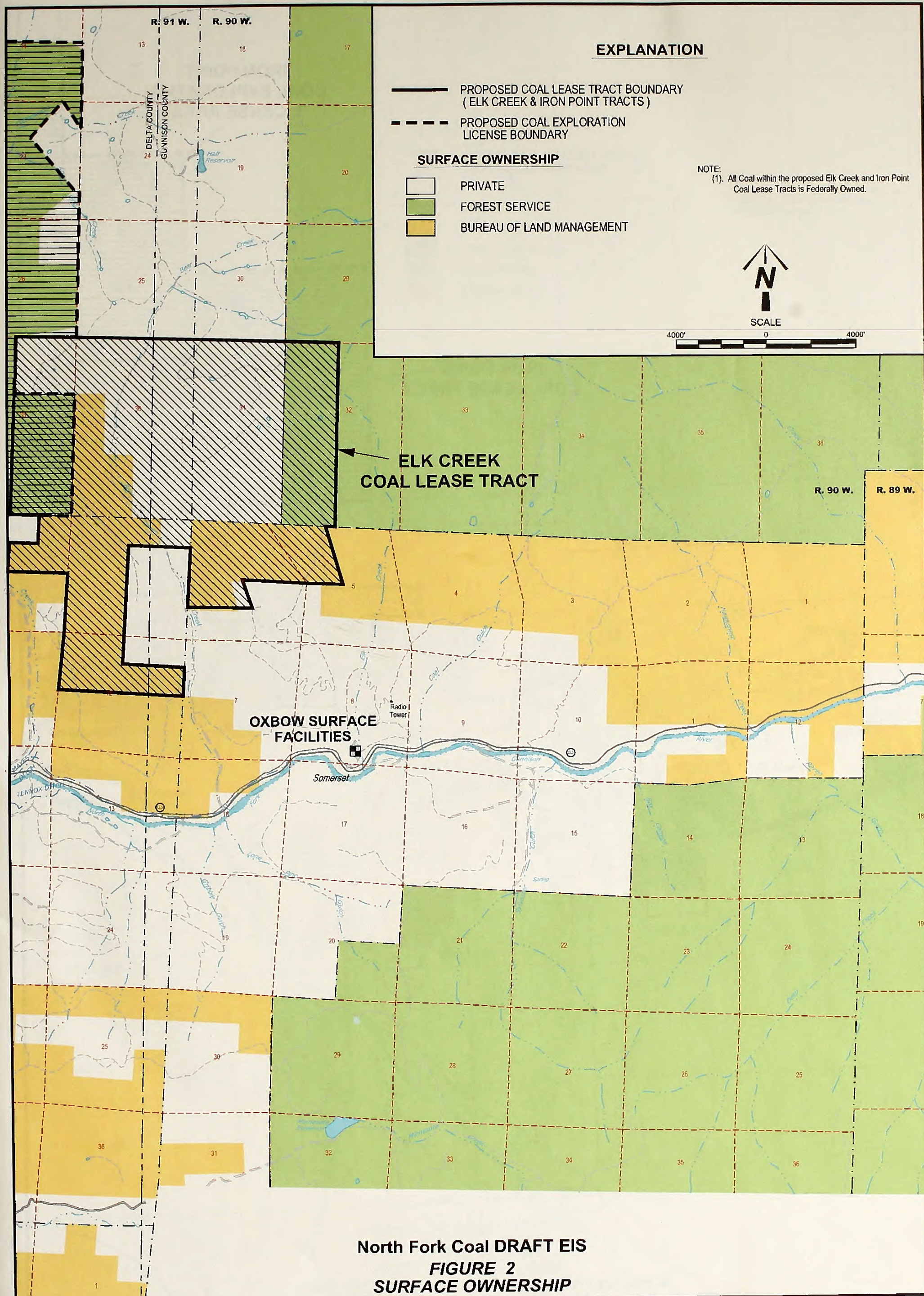
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North Fork Coal DRAFT EIS
FIGURE 1
GENERAL LOCATION MAP





IRON POINT
COAL EXPLORATION
LICENSE AREA

IRON POINT
COAL LEASE TRACT

C-53356

C-37210
Bowie No. 1

C-27432

C-36995

C-25079

Farmers

Bowie No. 2

Kingmine

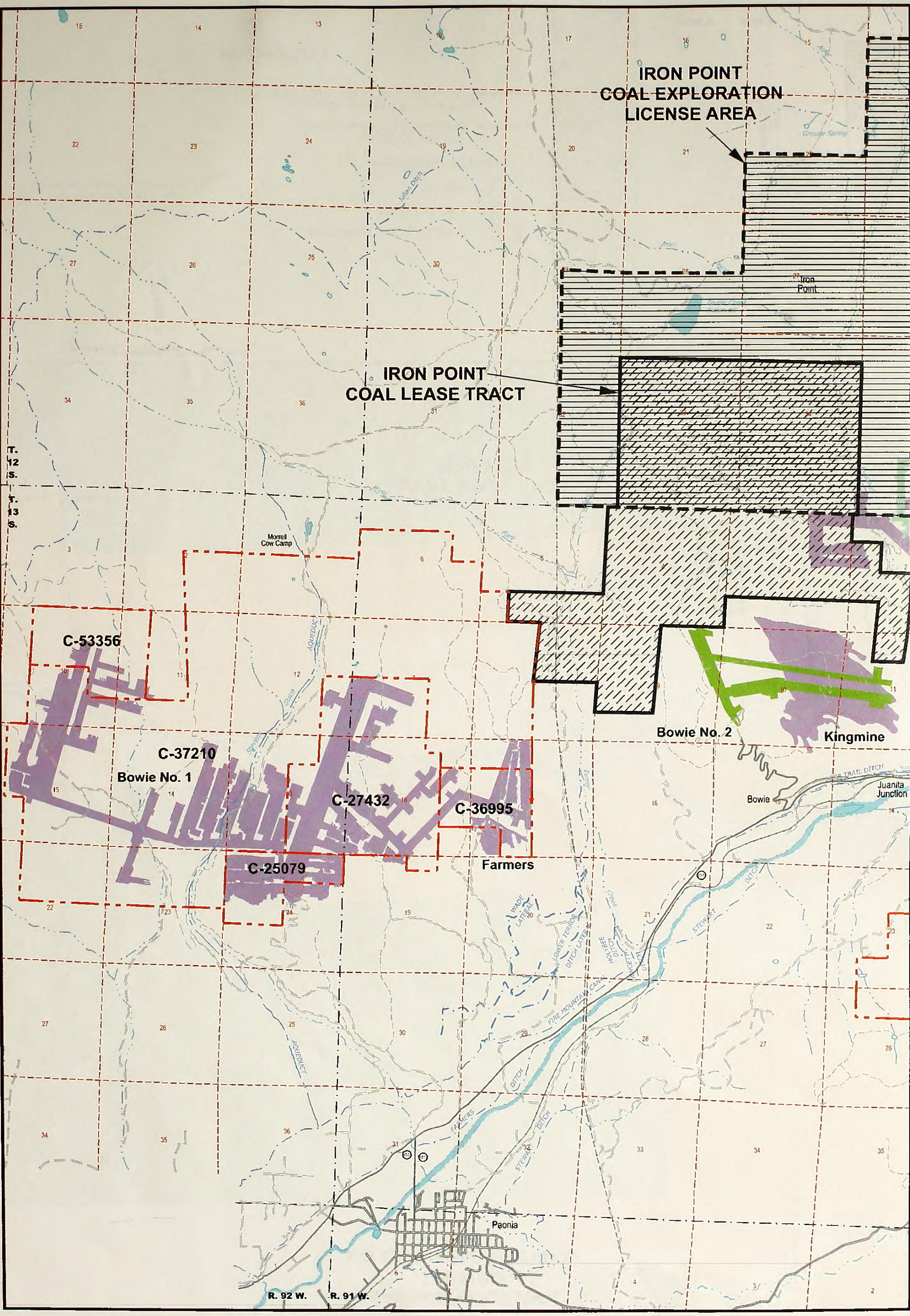
Bowie

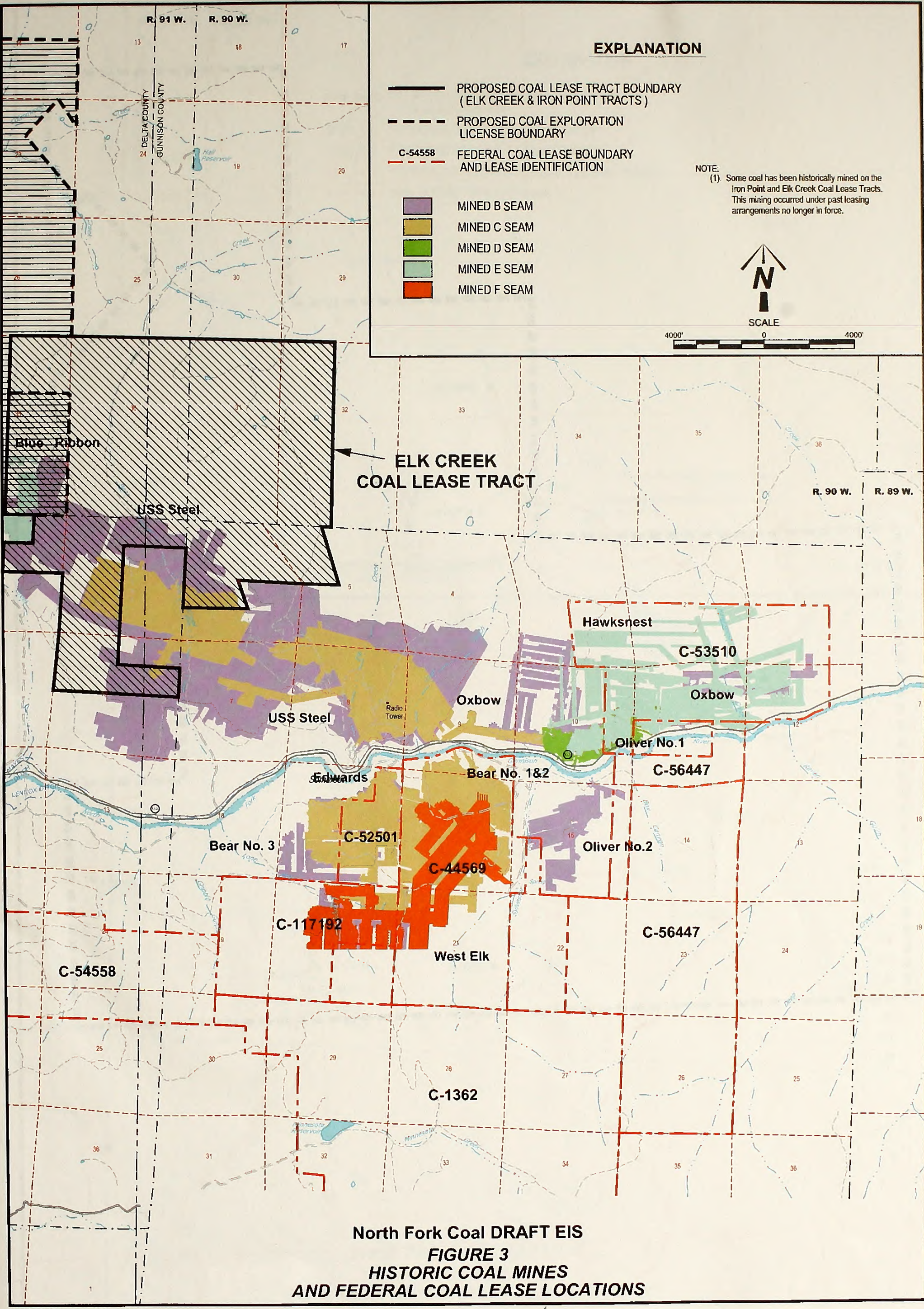
Juanita Junction

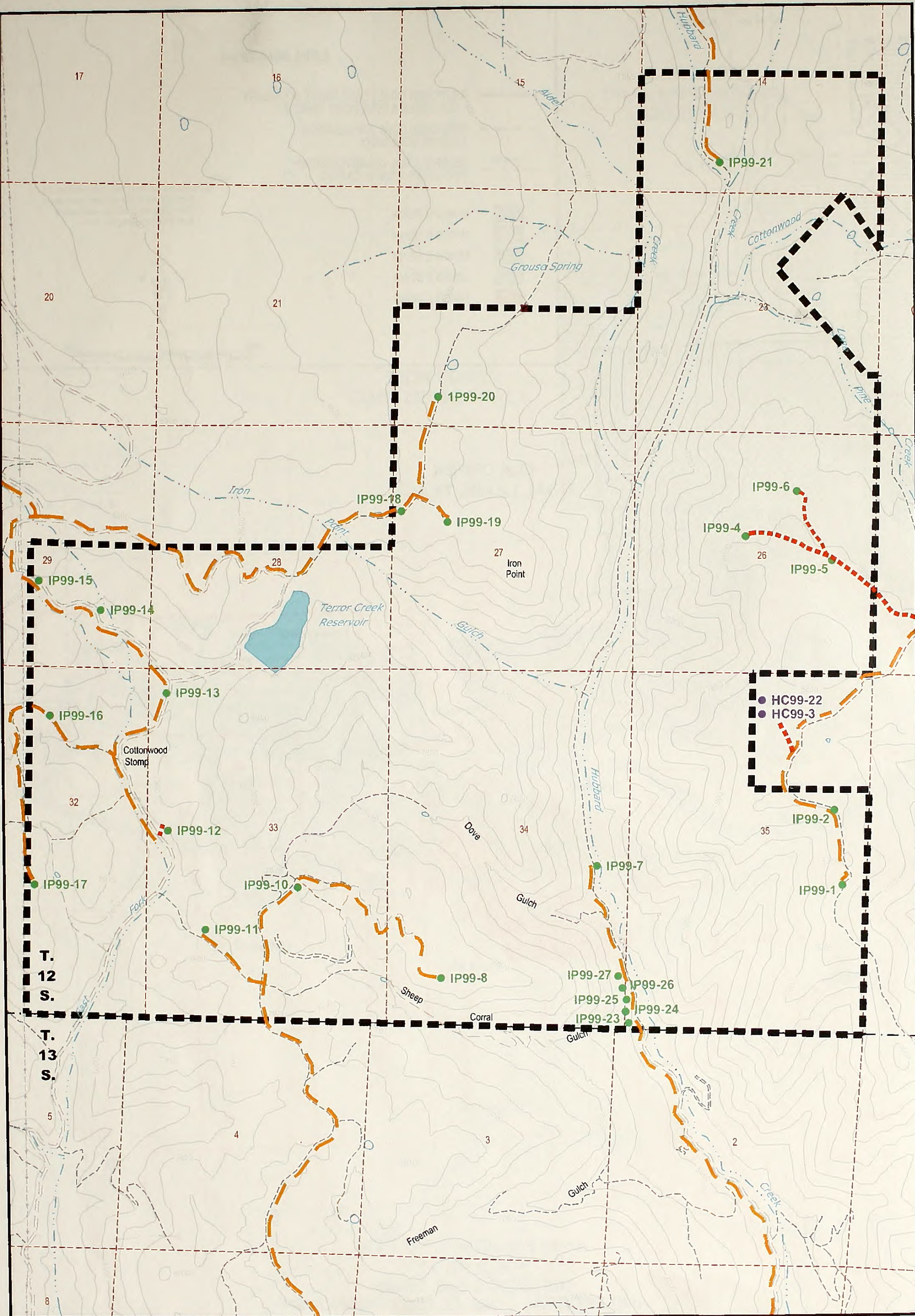
Paonia

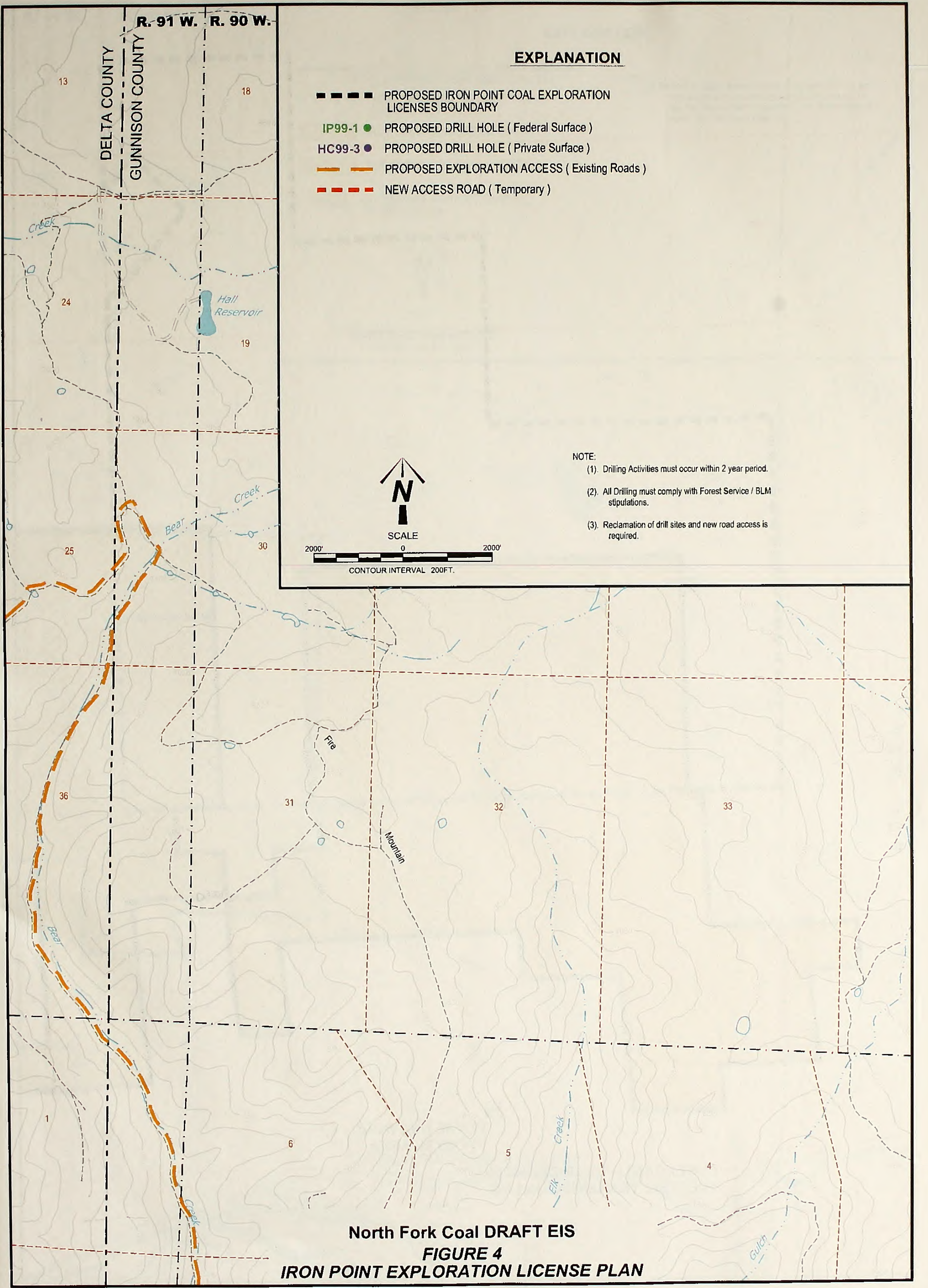
R. 92 W.

R. 91 W.









R. 91 W. R. 90 W.

DELTA COUNTY

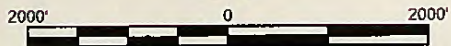
GUNNISON COUNTY

EXPLANATION

- PROPOSED IRON POINT COAL EXPLORATION LICENSES BOUNDARY
- IP99-1 ● PROPOSED DRILL HOLE (Federal Surface)
- HC99-3 ● PROPOSED DRILL HOLE (Private Surface)
- PROPOSED EXPLORATION ACCESS (Existing Roads)
- - - NEW ACCESS ROAD (Temporary)



SCALE



CONTOUR INTERVAL 200FT.

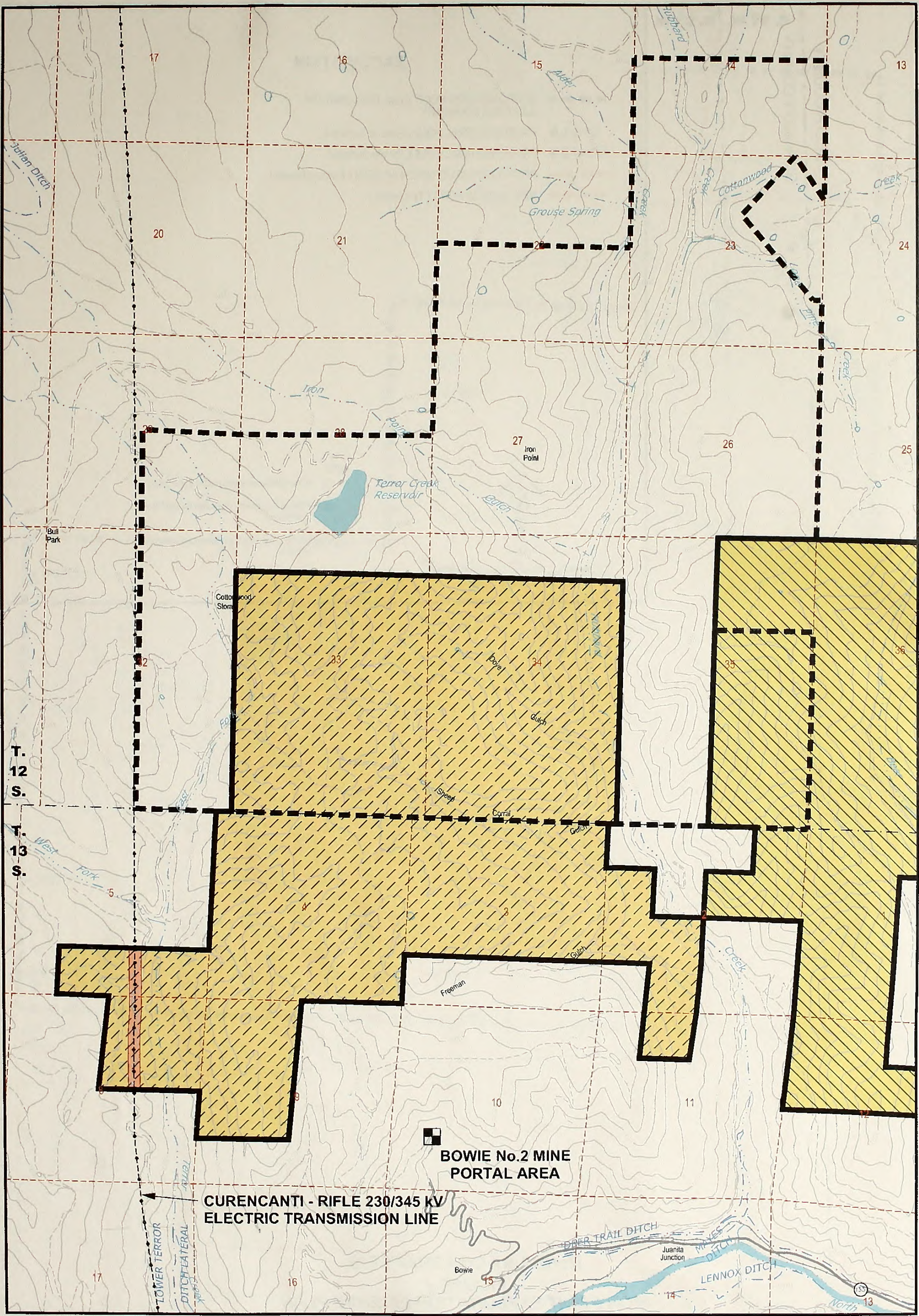
NOTE:

- (1). Drilling Activities must occur within 2 year period.
- (2). All Drilling must comply with Forest Service / BLM stipulations.
- (3). Reclamation of drill sites and new road access is required.

North Fork Coal DRAFT EIS

FIGURE 4

IRON POINT EXPLORATION LICENSE PLAN



T.
12
S.

T.
13
S.

**BOWIE No. 2 MINE
PORTAL AREA**

**CURENCANTI - RIFLE 230/345 KV
ELECTRIC TRANSMISSION LINE**

LOWER TRAIL DITCH

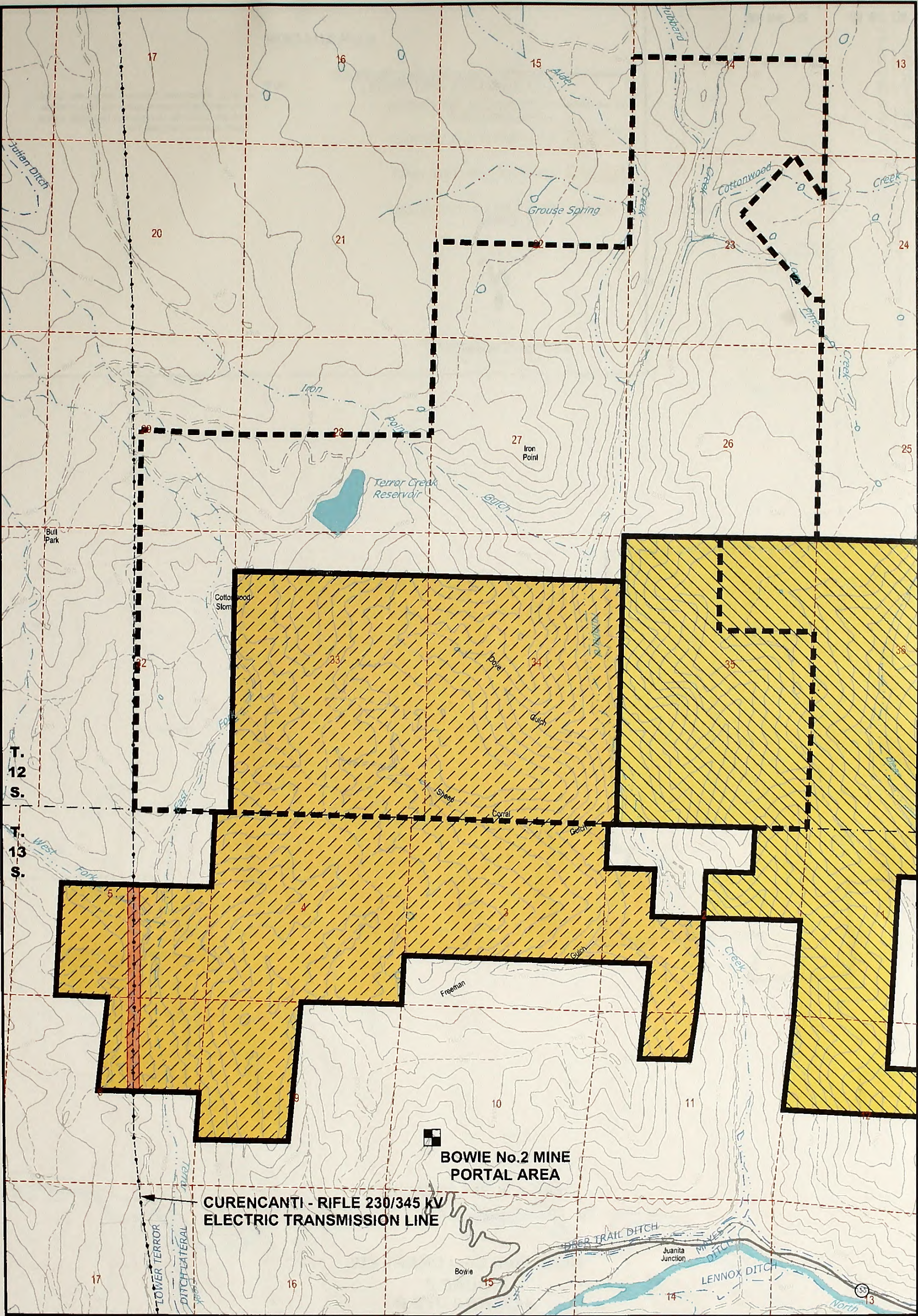
LENNOX DITCH

Juanita
Junction

Bowie

North





**BOWIE No.2 MINE
PORTAL AREA**

**CURENCANTI - RIFLE 230/345 KV
ELECTRIC TRANSMISSION LINE**



R. 91 W. R. 90 W.

DELTA COUNTY
GUNNISON COUNTY

EXPLANATION

- PROPOSED COAL LEASE TRACT BOUNDARY
(ELK CREEK & IRON POINT TRACTS)
- PROPOSED COAL EXPLORATION
LICENSE BOUNDARY
- IRON POINT COAL LEASE TRACT
- ELK CREEK COAL LEASE TRACT
- POWERLINE PROTECTION ZONE
(SEE NOTE No.1)

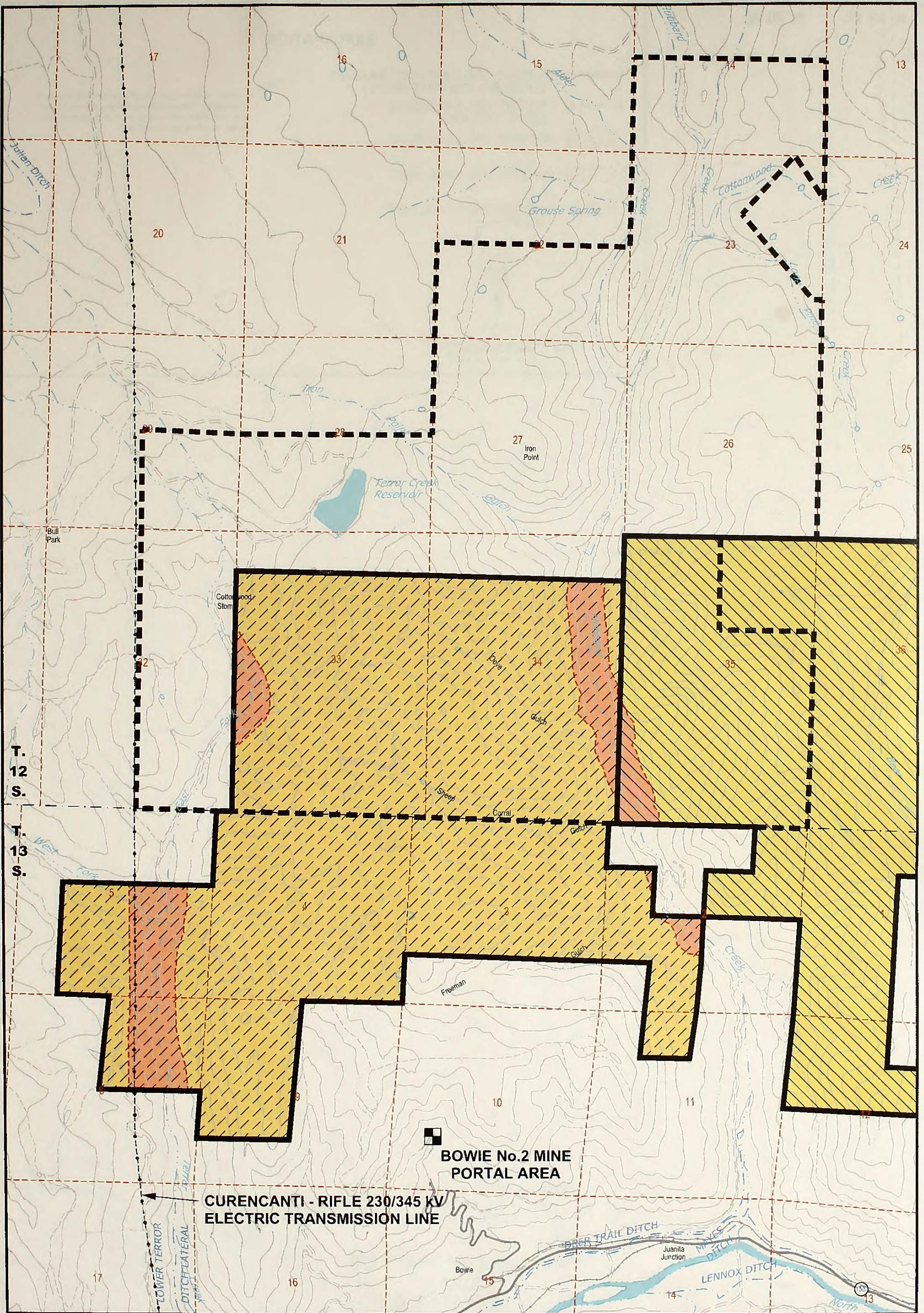
NOTE:
(1) No mining - related surface disturbance allowed within 100 feet
of the outside of the powerline right-of-way, which is 125 feet
wide. See Criterion No.2 in Appendix C, Unsuitability Analysis
Report - Iron Point Coal Lease Tract.




SCALE
2000' 0 2000'
CONTOUR INTERVAL 200FT.

OXBOW SURFACE FACILITIES

North Fork Coal DRAFT EIS
FIGURE 6
ALTERNATIVE C



CURENCANTI - RIFLE 230/345 KV
ELECTRIC TRANSMISSION LINE

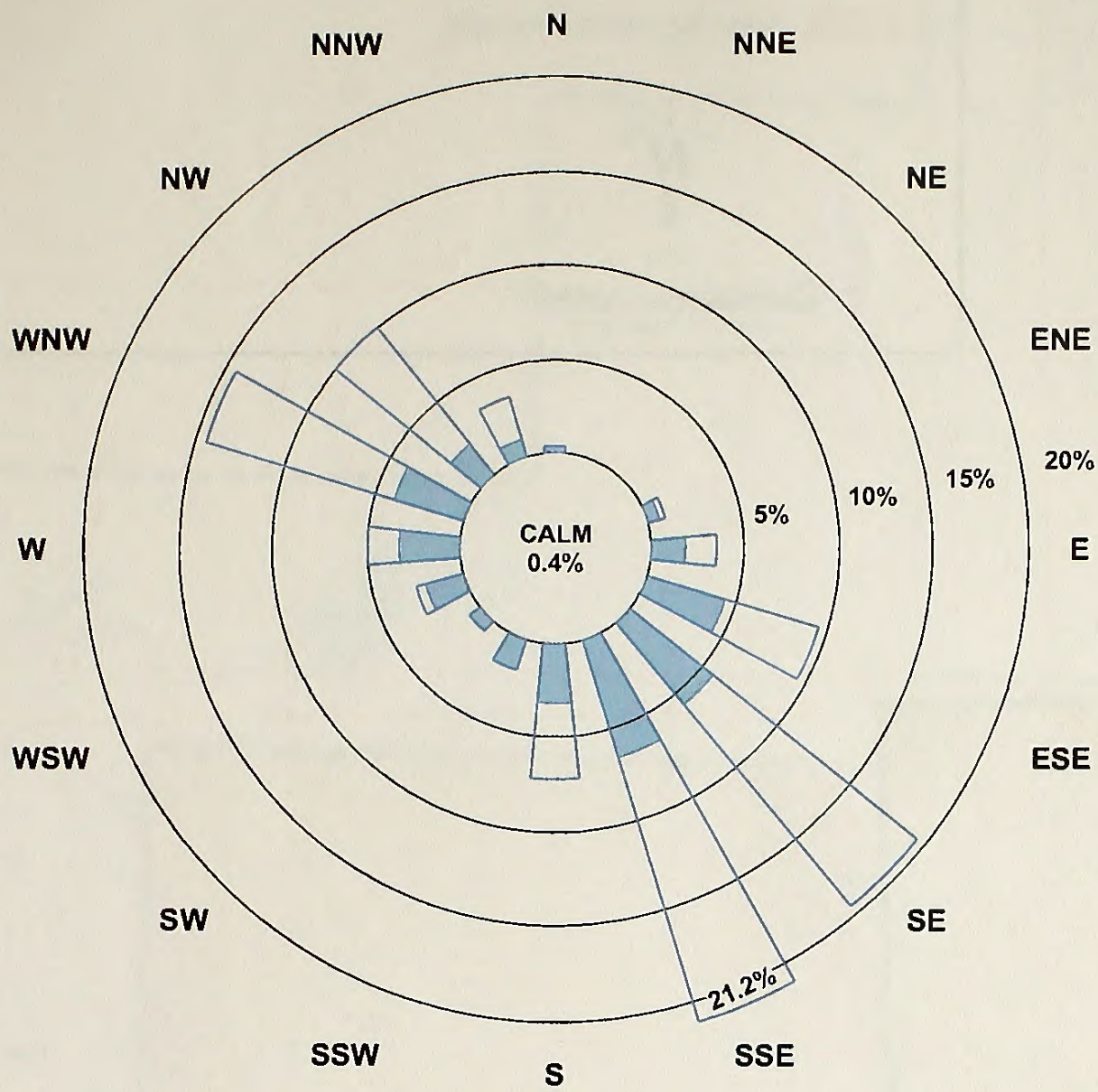
 **BOWIE No.2 MINE
PORTAL AREA**

LOWER TERROR
DITCH/LATERAL

EBER TRAIL DITCH

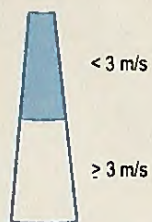
Juanita Junction
LENNOX DITCH





AVERAGE WIND SPEED = 3.6 m/s

EXPLANATION

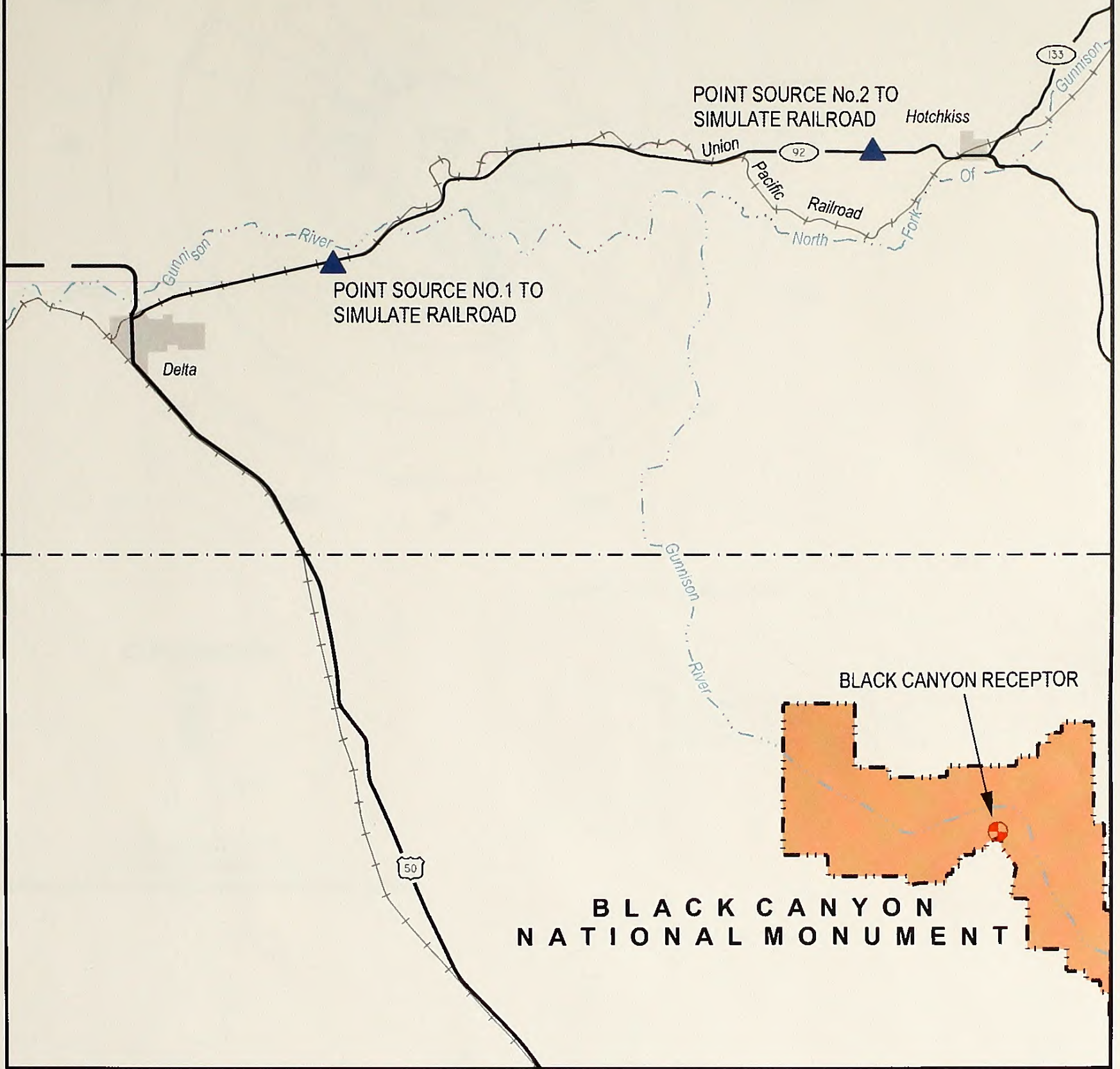


CALMS ARE WINDS WITH
SPEEDS LESS THAN 0.44 m/s
SHOWN AS DIRECTION FROM WHICH WIND IS BLOWING

NOTE:

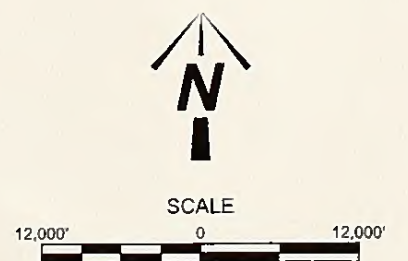
- (1). From West Elk Mine in Gunnison County, Colorado
- (2). Data Taken March 1987 through August 1987
- (3). SOURCE: Air Sciences Inc. of Lakewood, Colorado

North Fork Coal DRAFT EIS
FIGURE 8
 WIND ROSE FOR WEST ELK MINE



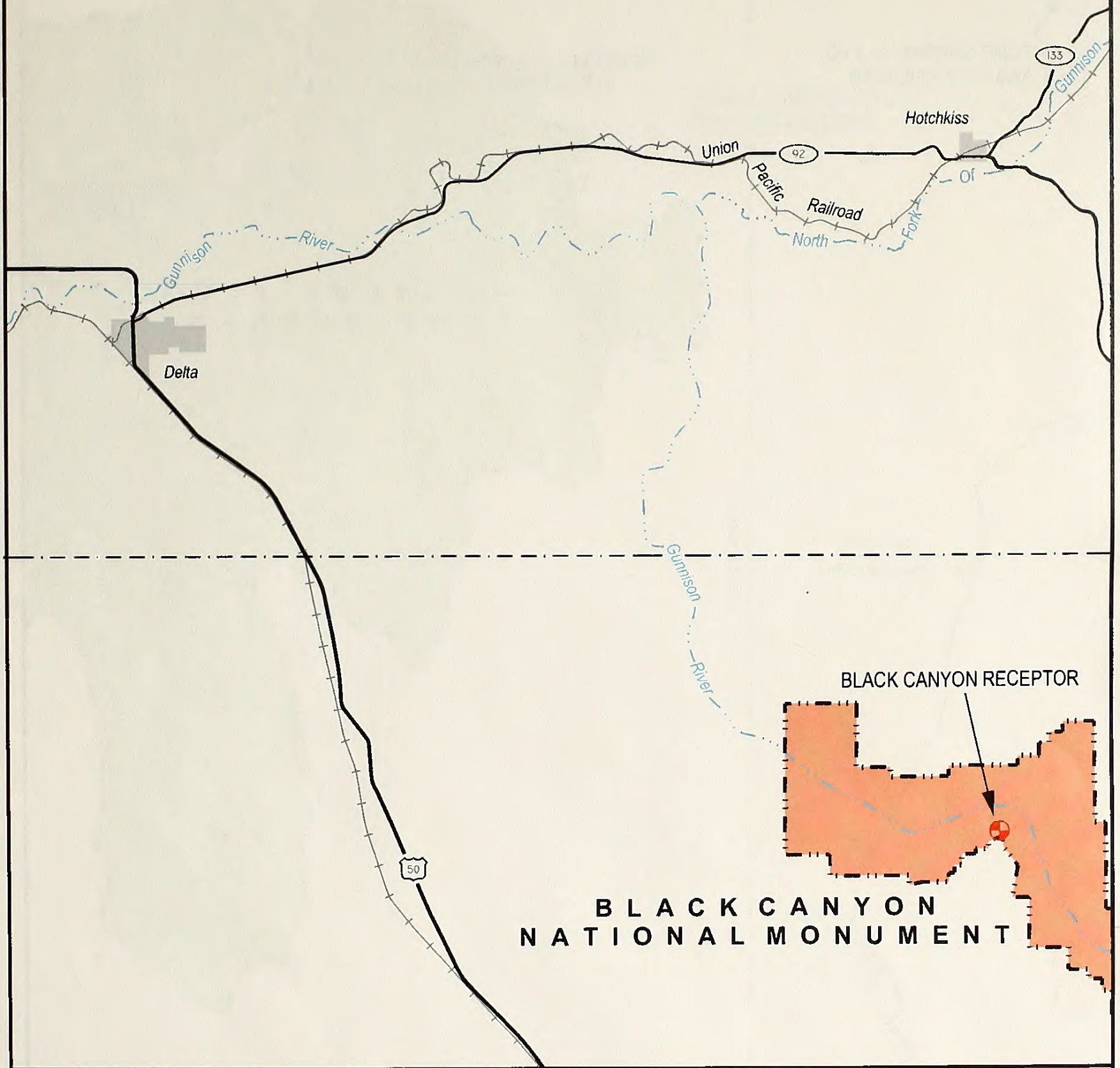
EXPLANATION

- IRON POINT COAL LEASE TRACT
- ELK CREEK COAL LEASE TRACT
- POINT SOURCE LOCATION









North Fork Coal DRAFT EIS
FIGURE 9
EMISSION SOURCES AND WILDERNESS AREA
RECEPTORS FOR VISIBILITY AND ACID DEPOSITION MODELING



EXPLANATION

-  IRON POINT COAL LEASE TRACT
-  ELK CREEK COAL LEASE TRACT
-  VIEWING DIRECTION
-  WIND DIRECTION

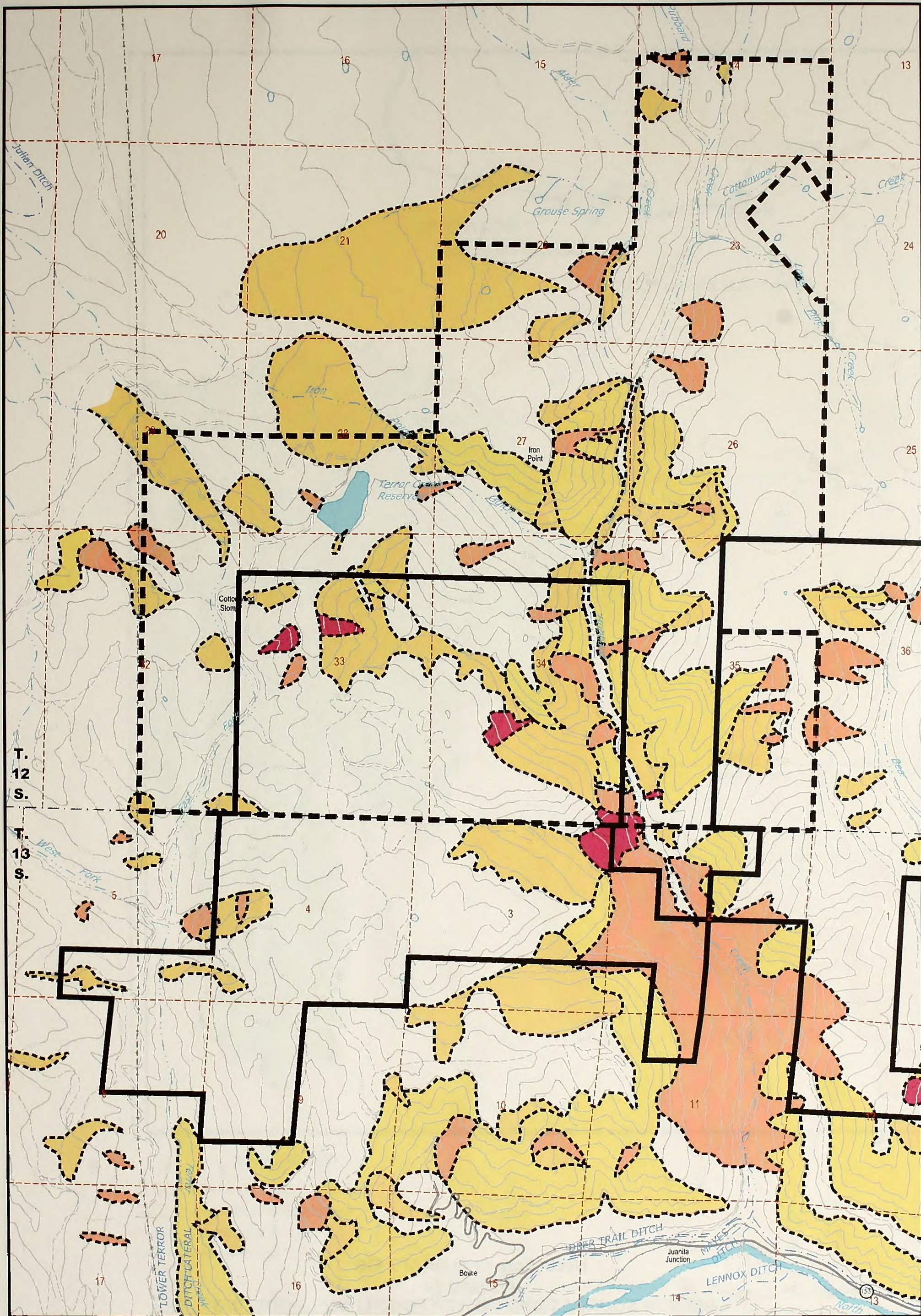


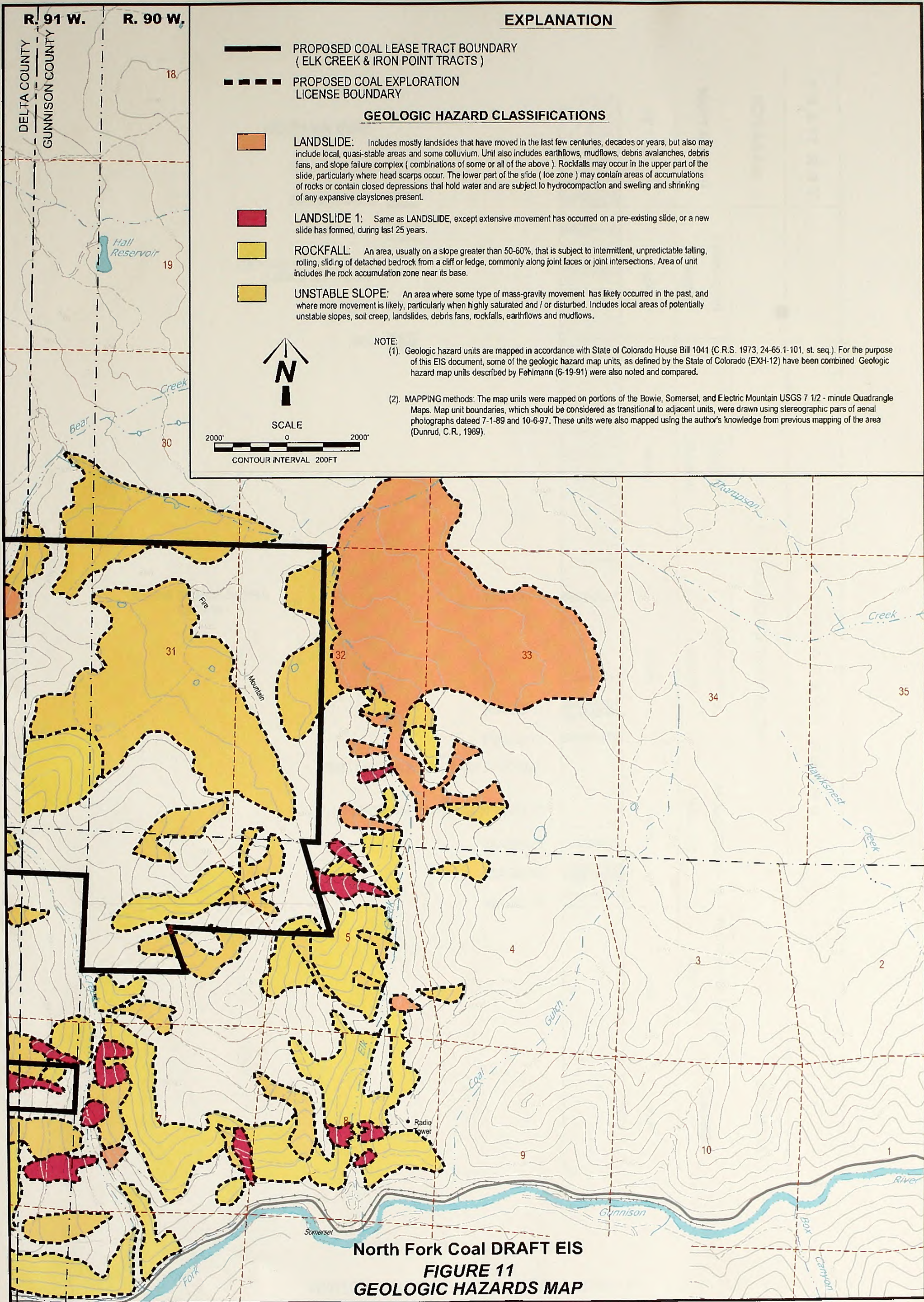
SCALE

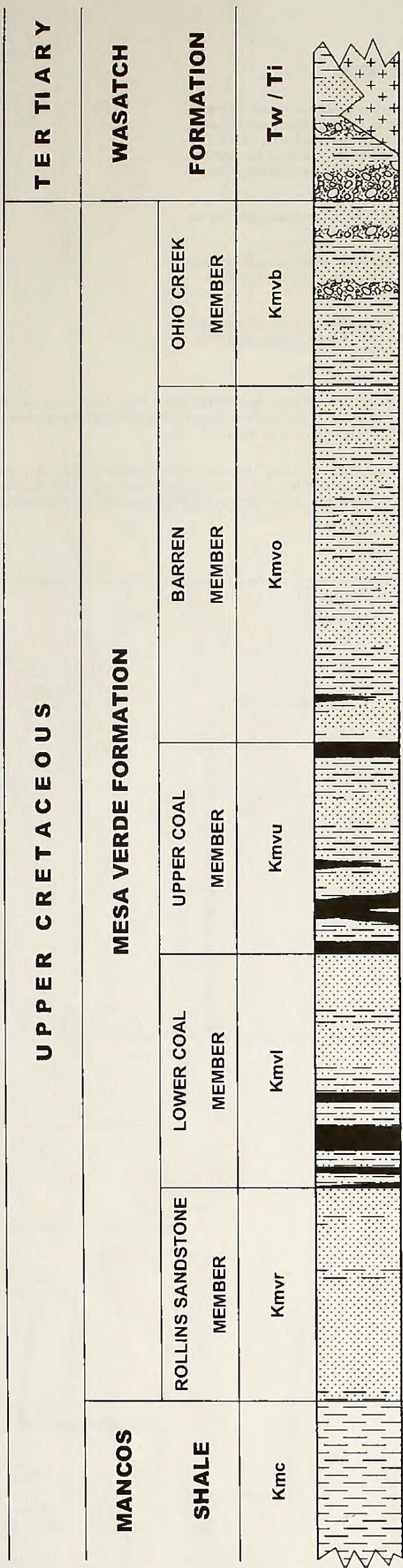
12,000' 0 12,000'



North Fork Coal DRAFT EIS
FIGURE 10
EMISSION SOURCES AND VIEWER FOR PLUVUE MODELING

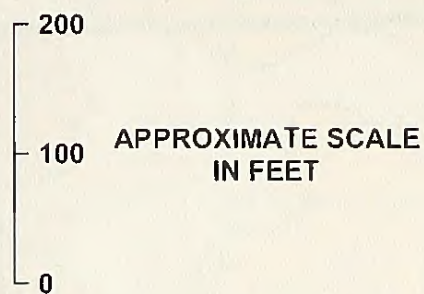






EXPLANATION

- IGNEOUS ROCKS
- CONGLOMERATE
- SANDSTONE
- SILTSTONE, INTERBEDDED SANDSTONE & SHALE
- SHALE
- COAL



F-SEAM

E-SEAM

D-SEAM

"UPPER MARINE SANDSTONE"

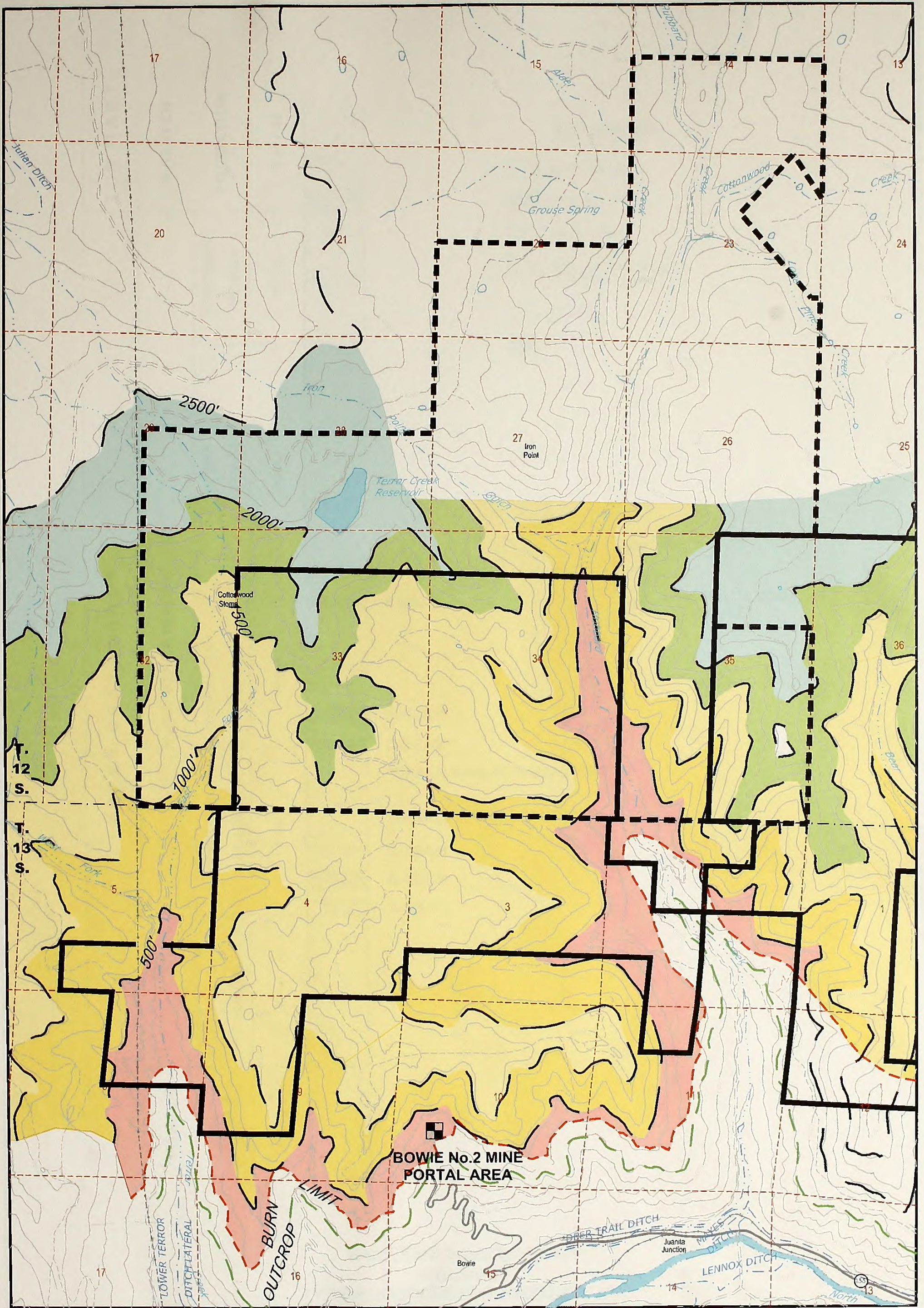
"LOWER MARINE SANDSTONE"

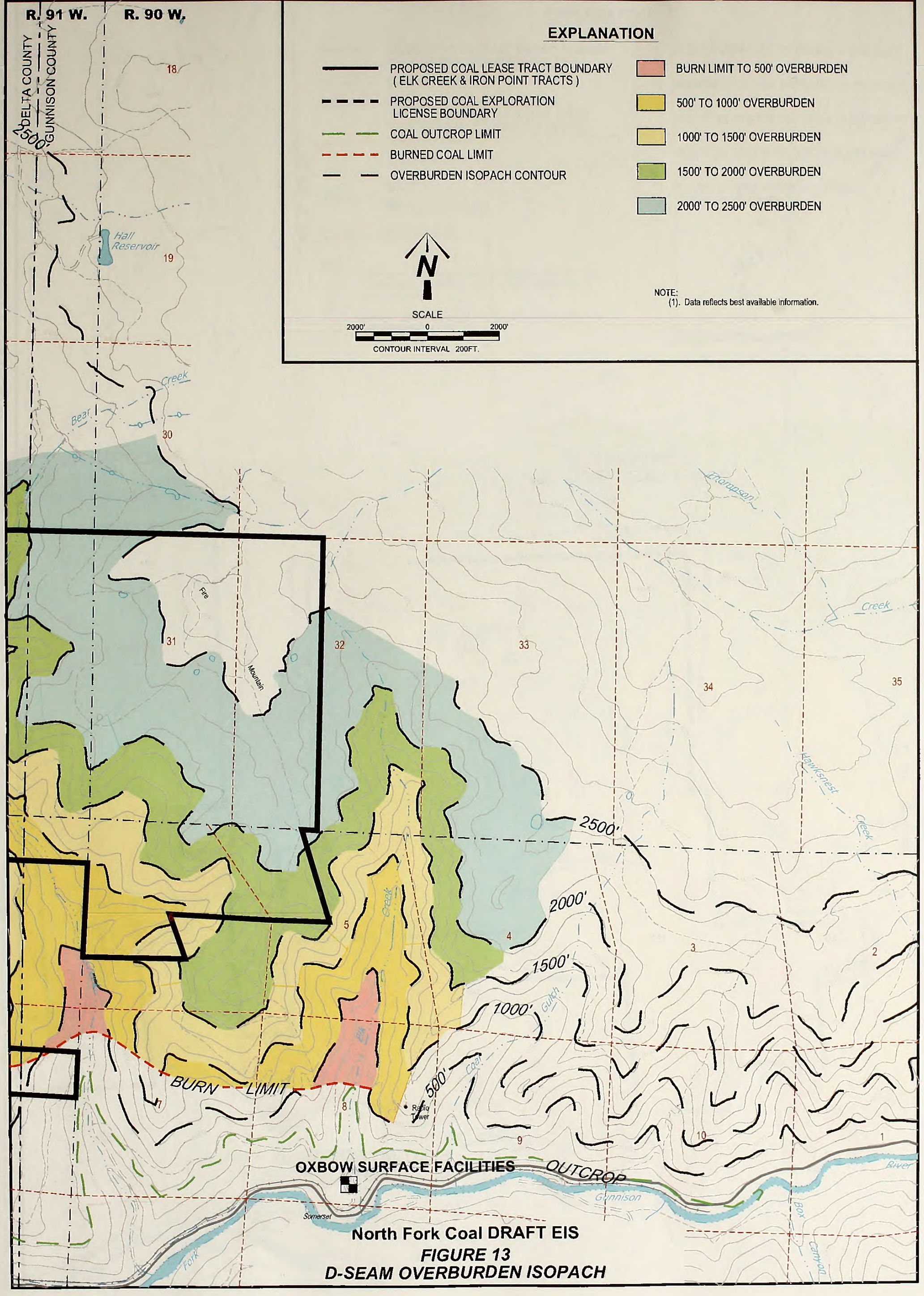
C-SEAM

B-SEAM

A-SEAM

North Fork Coal DRAFT EIS
FIGURE 12
TYPICAL GEOLOGIC CROSS-SECTION





R. 91 W. R. 90 W.

DELTA COUNTY
GUNNISON COUNTY

EXPLANATION

- | | | | |
|--|---|--|-------------------------------|
| | PROPOSED COAL LEASE TRACT BOUNDARY
(ELK CREEK & IRON POINT TRACTS) | | BURN LIMIT TO 500' OVERBURDEN |
| | PROPOSED COAL EXPLORATION
LICENSE BOUNDARY | | 500' TO 1000' OVERBURDEN |
| | COAL OUTCROP LIMIT | | 1000' TO 1500' OVERBURDEN |
| | BURNED COAL LIMIT | | 1500' TO 2000' OVERBURDEN |
| | OVERBURDEN ISOPACH CONTOUR | | 2000' TO 2500' OVERBURDEN |

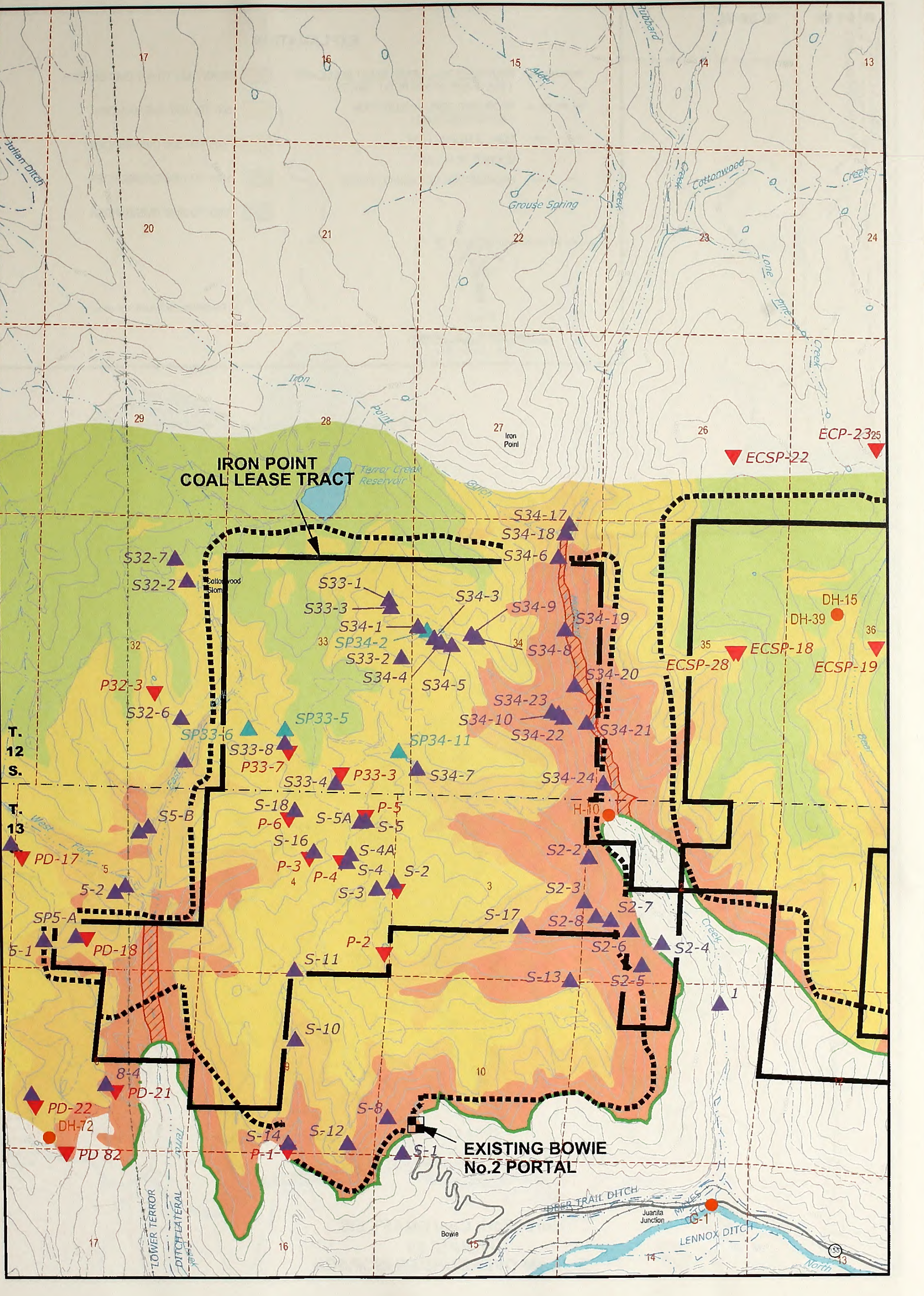


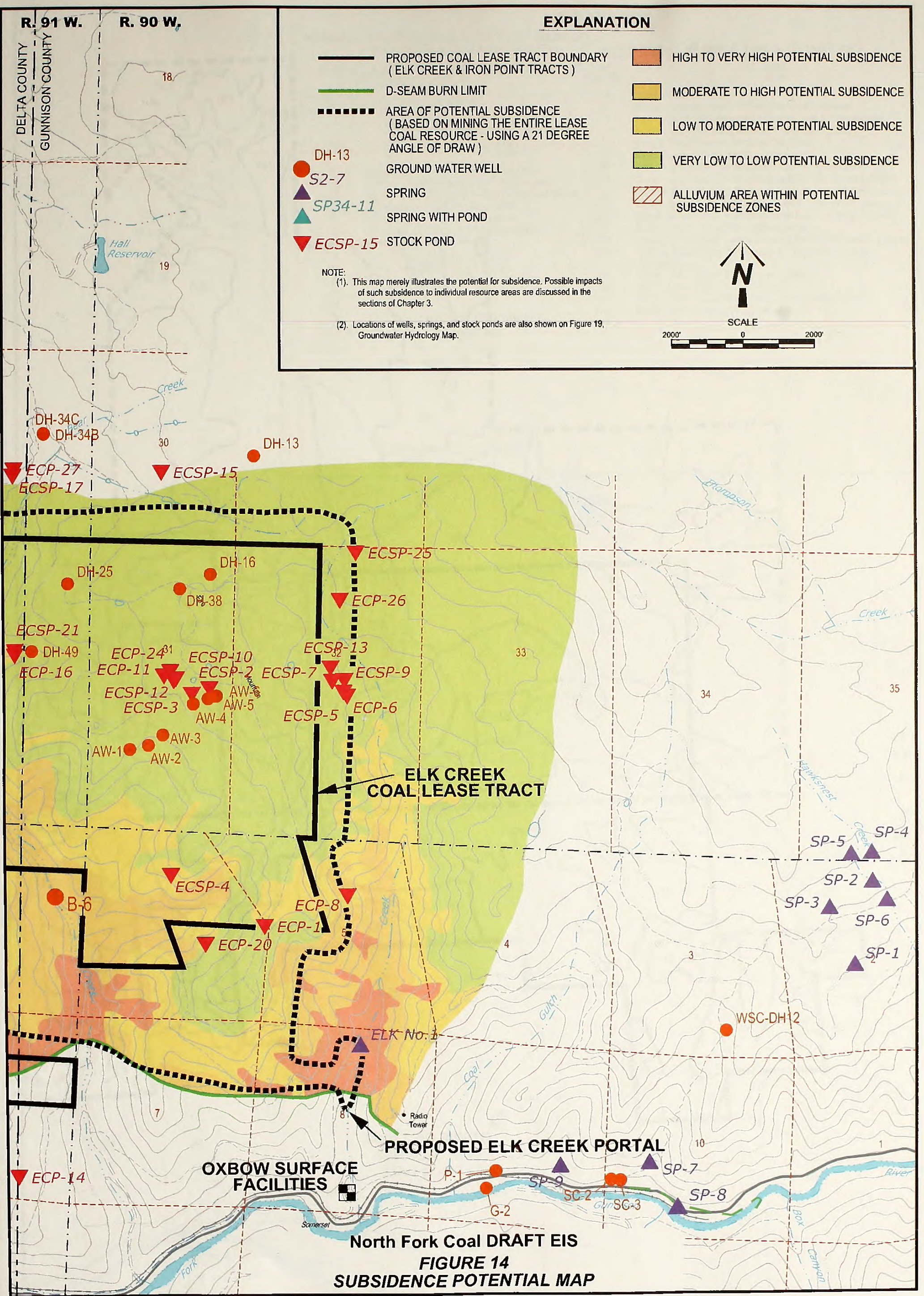
SCALE
2000' 0 2000'
CONTOUR INTERVAL 200FT.

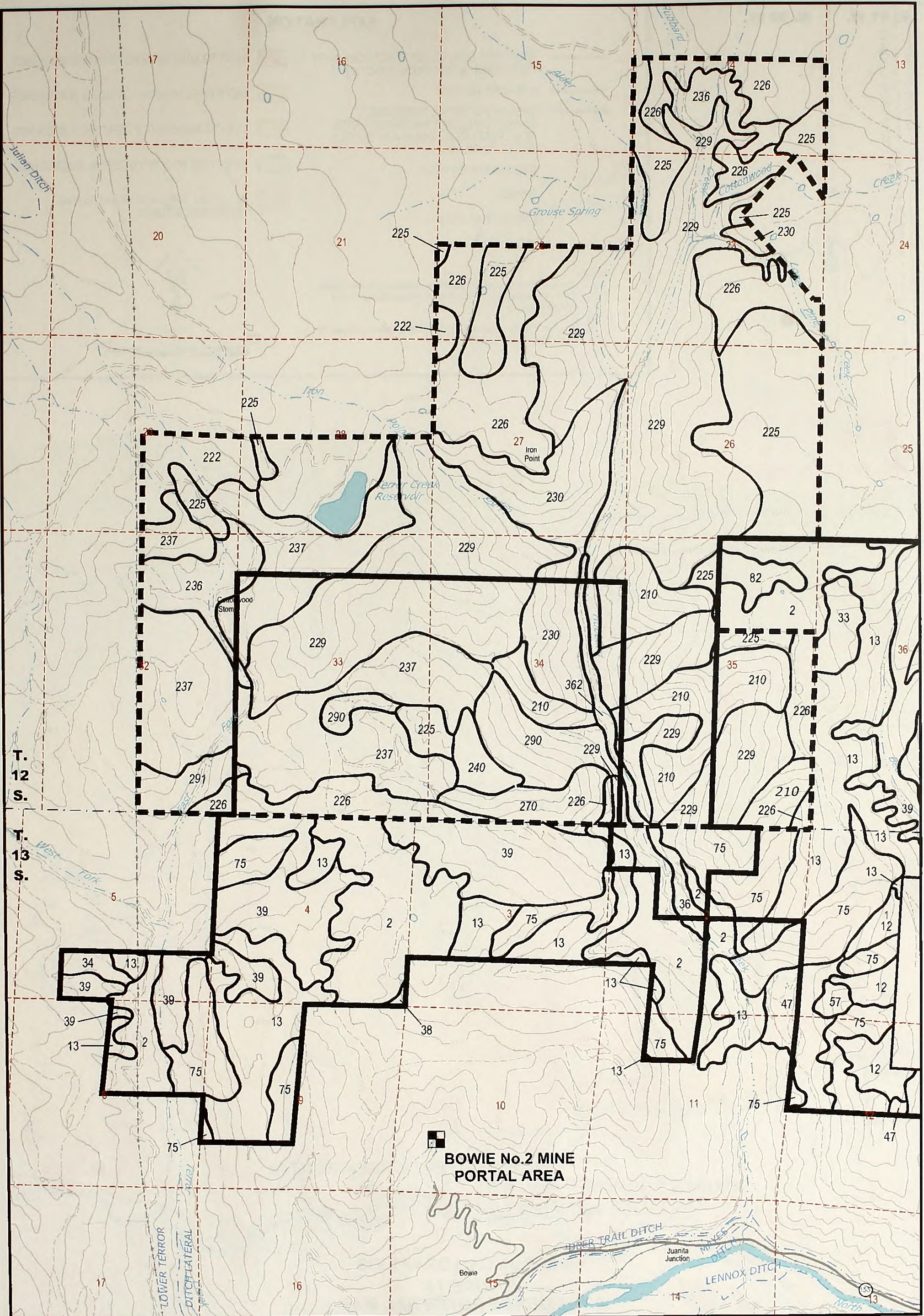
NOTE:
(1). Data reflects best available information.

OXBOW SURFACE FACILITIES

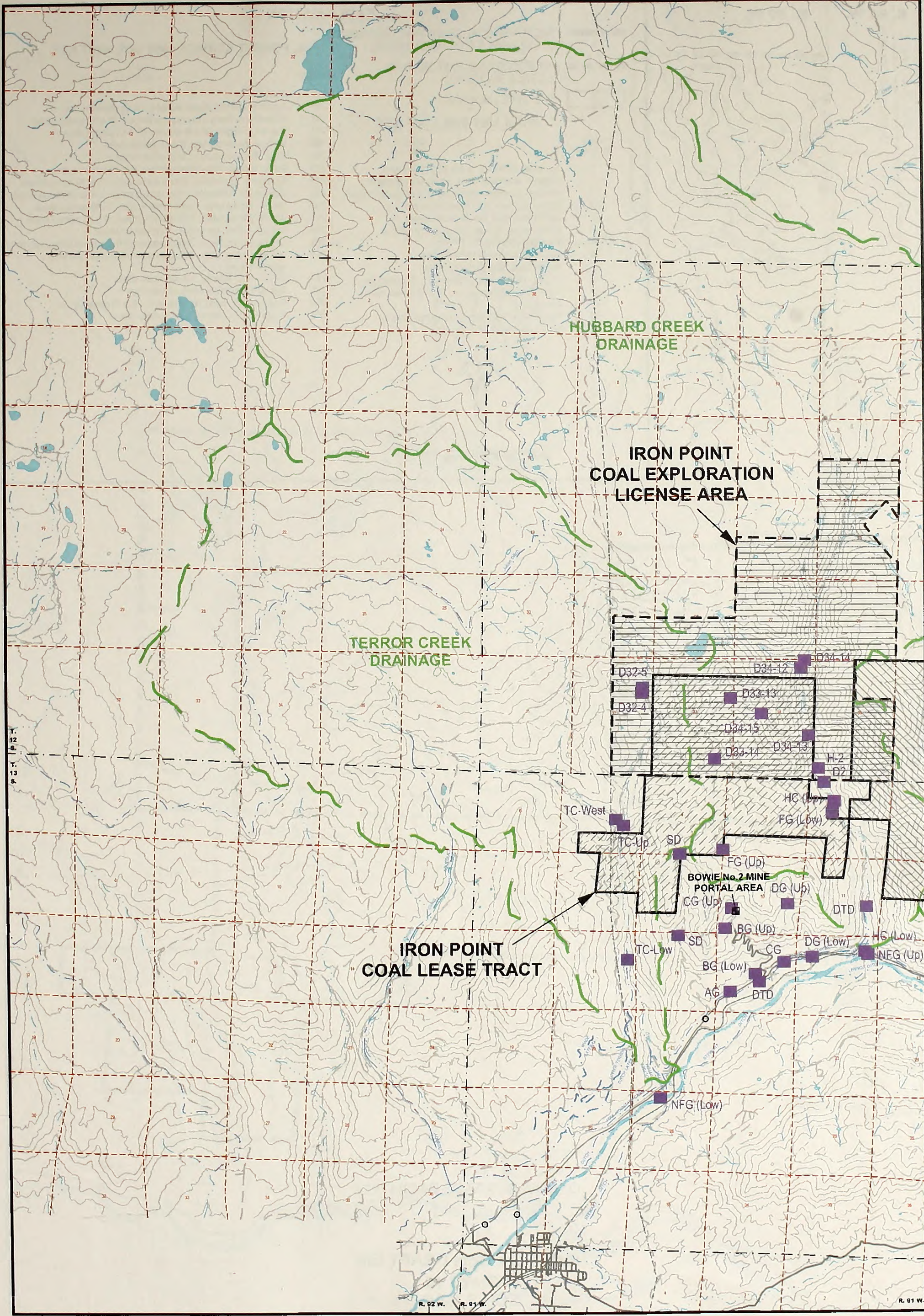
**North Fork Coal DRAFT EIS
FIGURE 13
D-SEAM OVERBURDEN ISOPACH**







**BOWIE No. 2 MINE
PORTAL AREA**



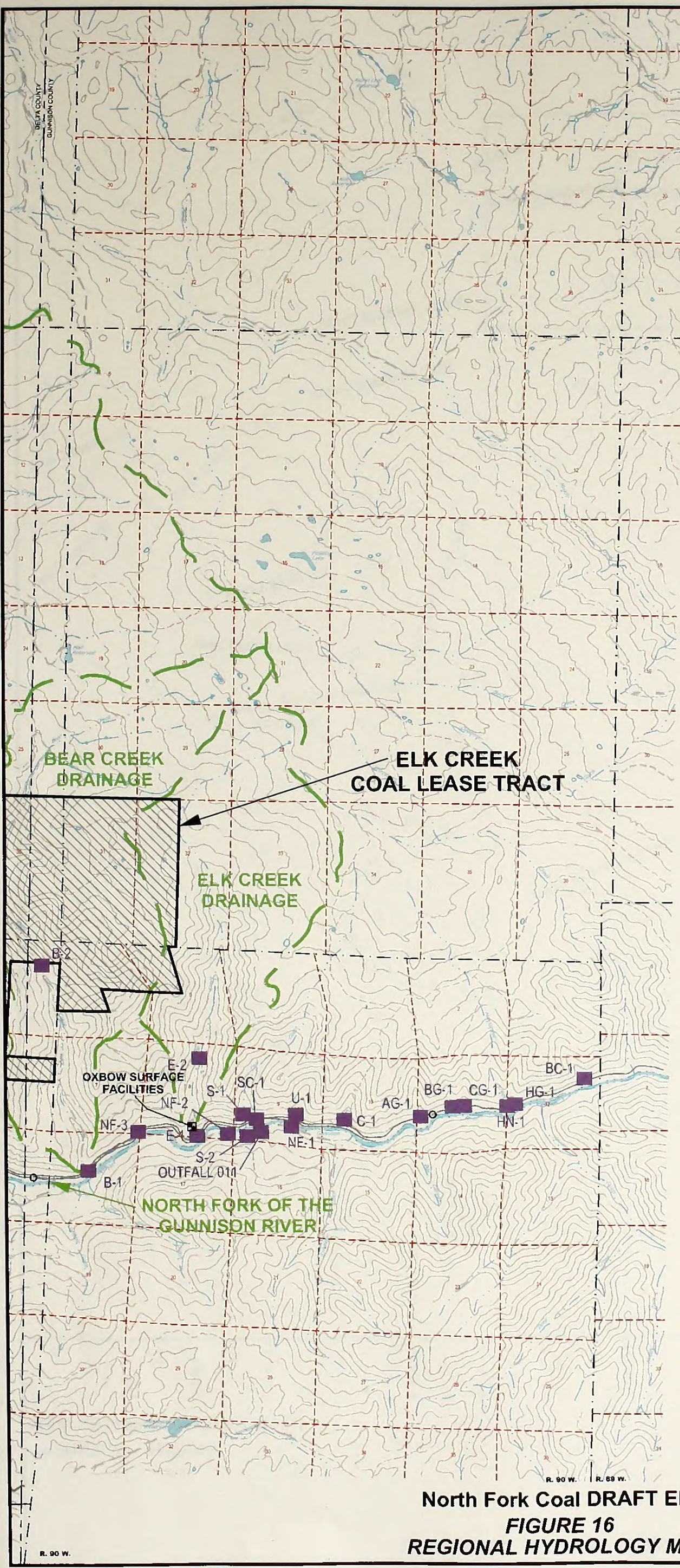
HUBBARD CREEK DRAINAGE

IRON POINT COAL EXPLORATION LICENSE AREA



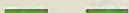

TERROR CREEK DRAINAGE

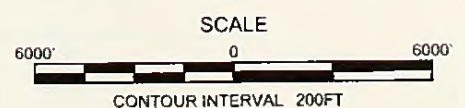
IRON POINT COAL LEASE TRACT

D32-5
D32-4
D33-13
D34-15
D33-14
D34-13
D34-12
D34-14
H-2
D2
TC-West
TC-Up
SD
FG (Up)
BOWIE No. 2 MINE PORTAL AREA
CG (Up)
FG (Low)
HC (Up)
DTD
TC-Low
SD
BG (Up)
CG
DG (Up)
BG (Low)
AG
DTD
NFG (Up)
NFG (Low)
DG (Low)
CG (Low)
BG (Low)
FG (Low)
HC (Low)



EXPLANATION

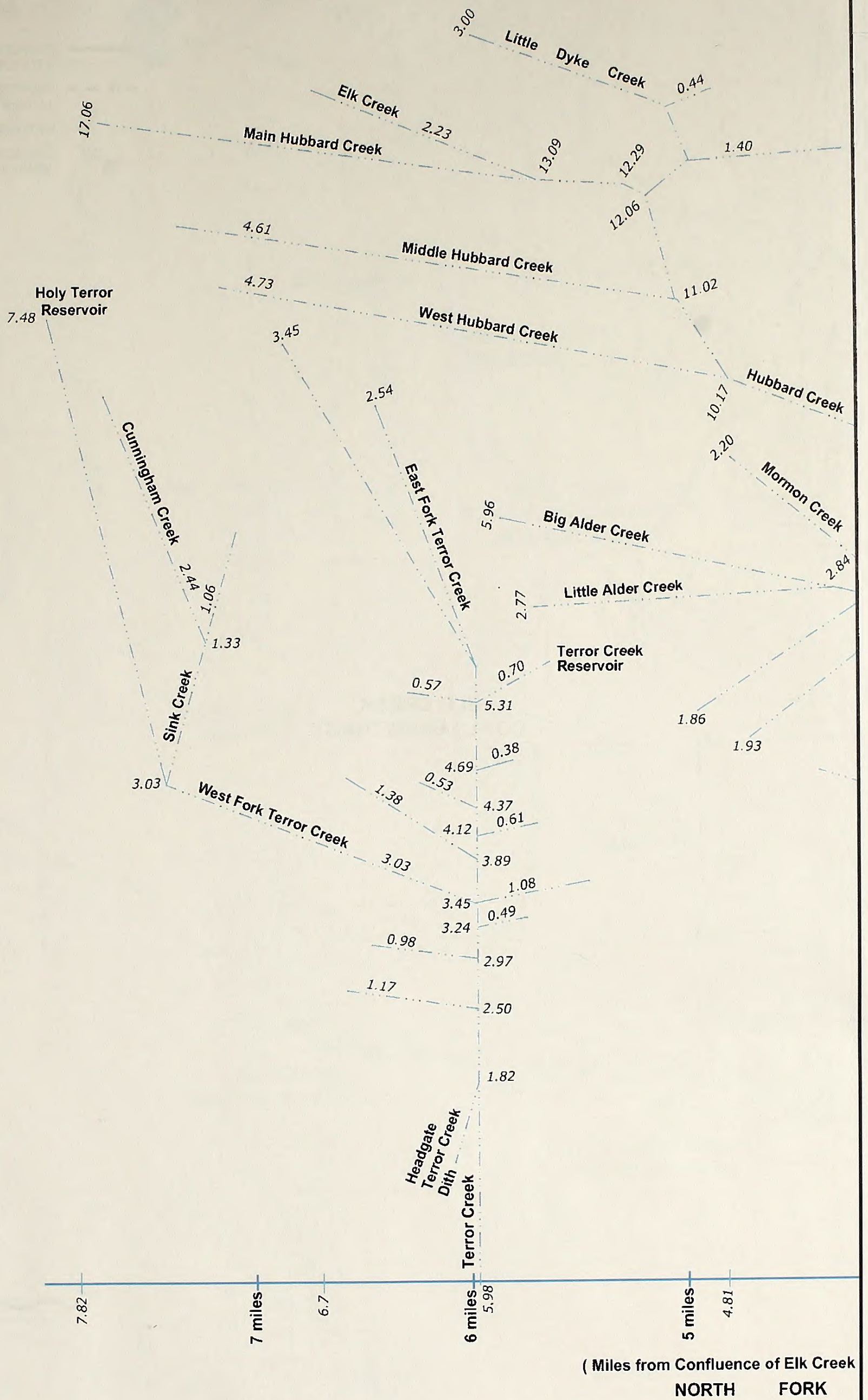
-  PROPOSED COAL LEASE TRACT BOUNDARY (ELK CREEK & IRON POINT TRACTS)
-  PROPOSED COAL EXPLORATION LICENSE BOUNDARY
-  WATERSHED BOUNDARY
-  SURFACE WATER MONITORING LOCATION



North Fork Coal DRAFT EIS
FIGURE 16
REGIONAL HYDROLOGY MAP

R. 90 W.

R. 90 W. R. 69 W.

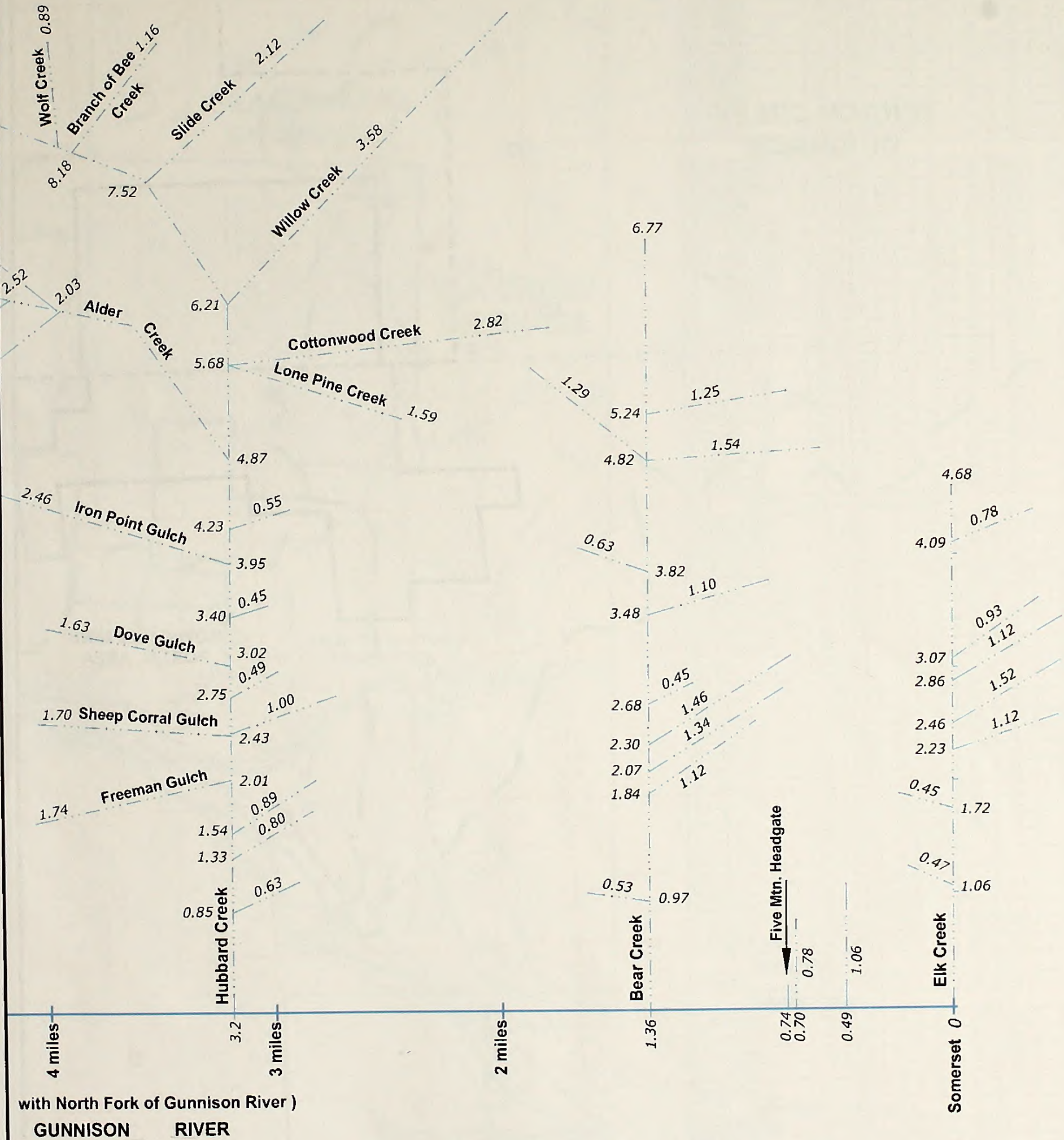


EXPLANATION

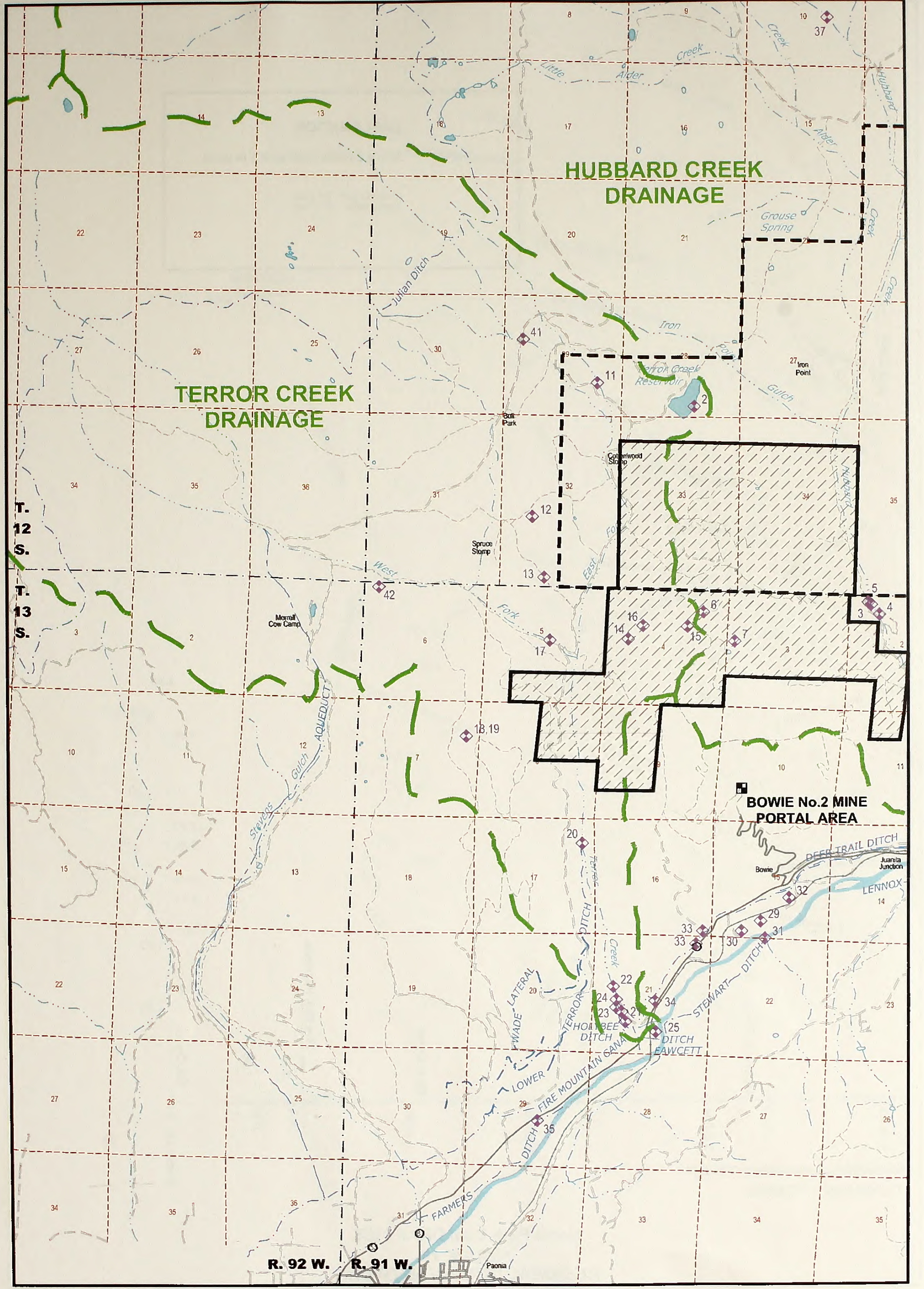


DISTANCE FROM CONFLUENCE IN MILES

Horizontal Scale: 2" = 1 mile
Vertical Scale: 1" = 1 mile



North Fork Coal DRAFT EIS
FIGURE 17
REGIONAL STREAM NETWORK

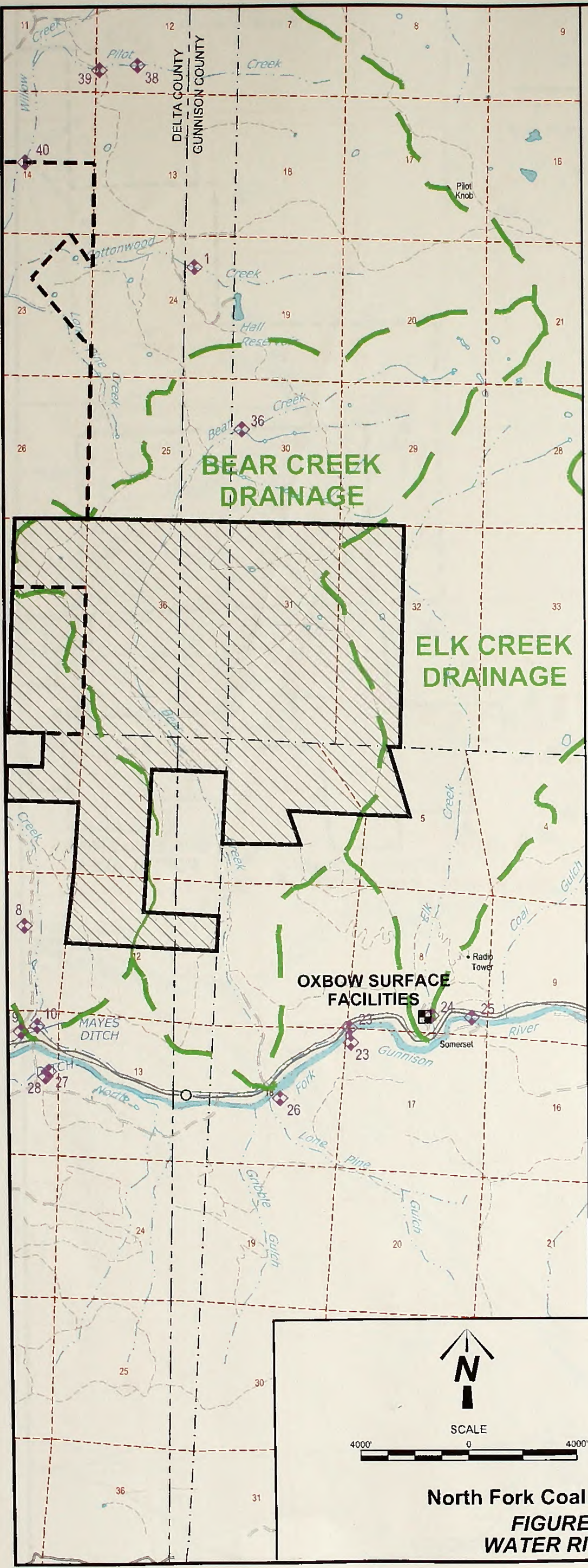


**HUBBARD CREEK
DRAINAGE**

**TERROR CREEK
DRAINAGE**

**BOWTIE No. 2 MINE
PORTAL AREA**

R. 92 W. R. 91 W.



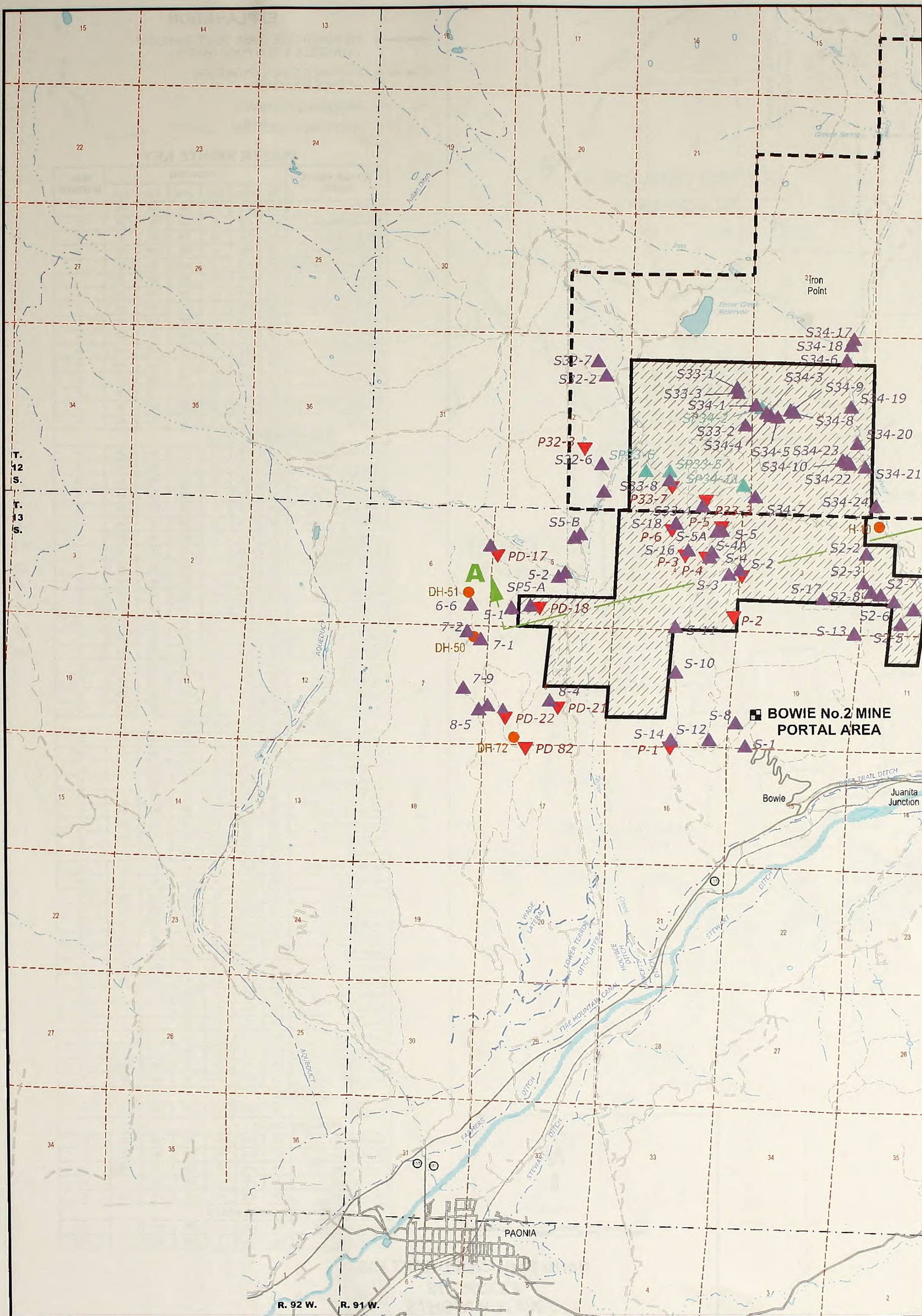
EXPLANATION

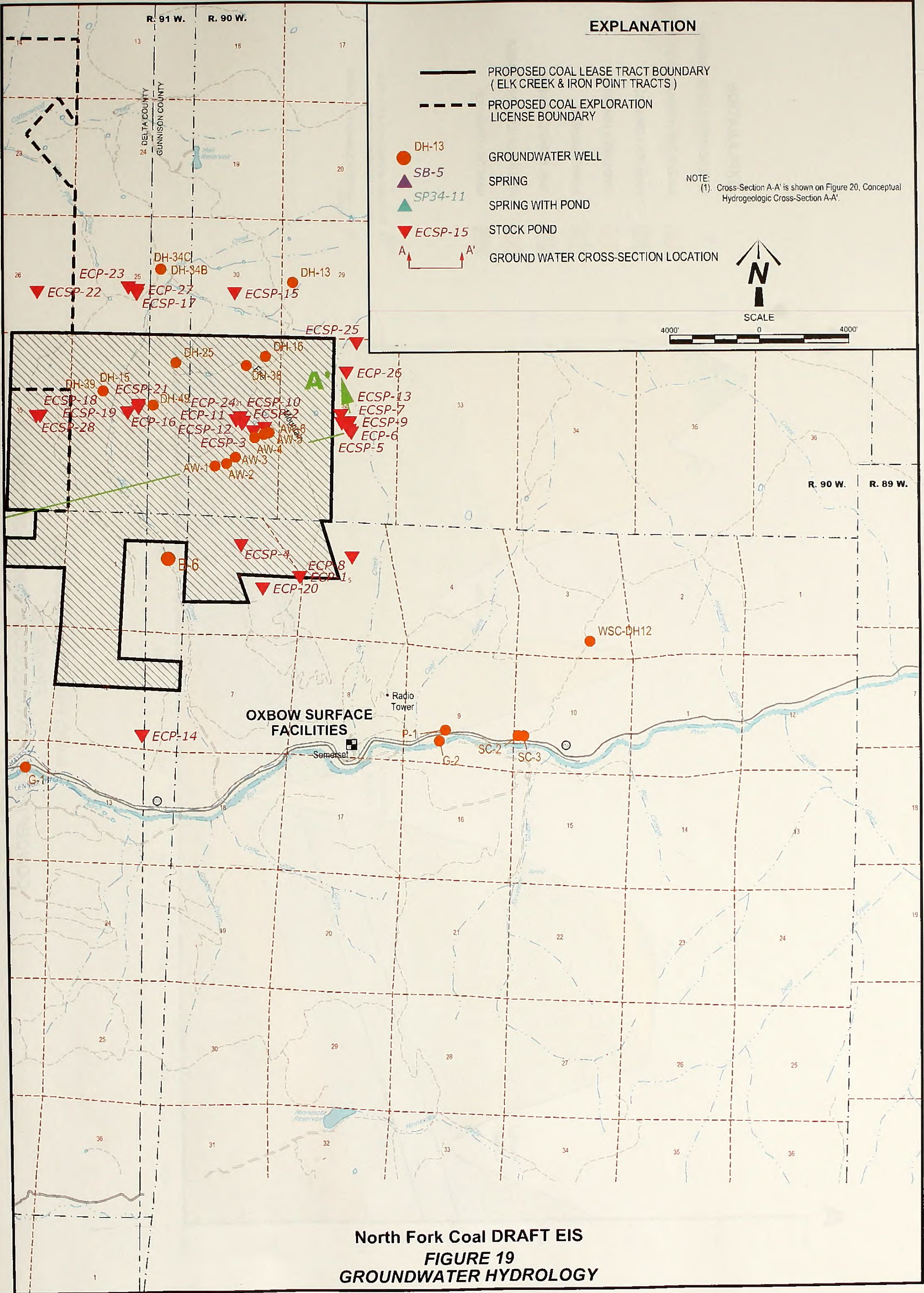
- PROPOSED COAL LEASE TRACT BOUNDARY (ELK CREEK & IRON POINT TRACTS)
- PROPOSED COAL EXPLORATION LICENSE BOUNDARY
- WATERSHED BOUNDARY
- 40 WATER RIGHT LOCATION

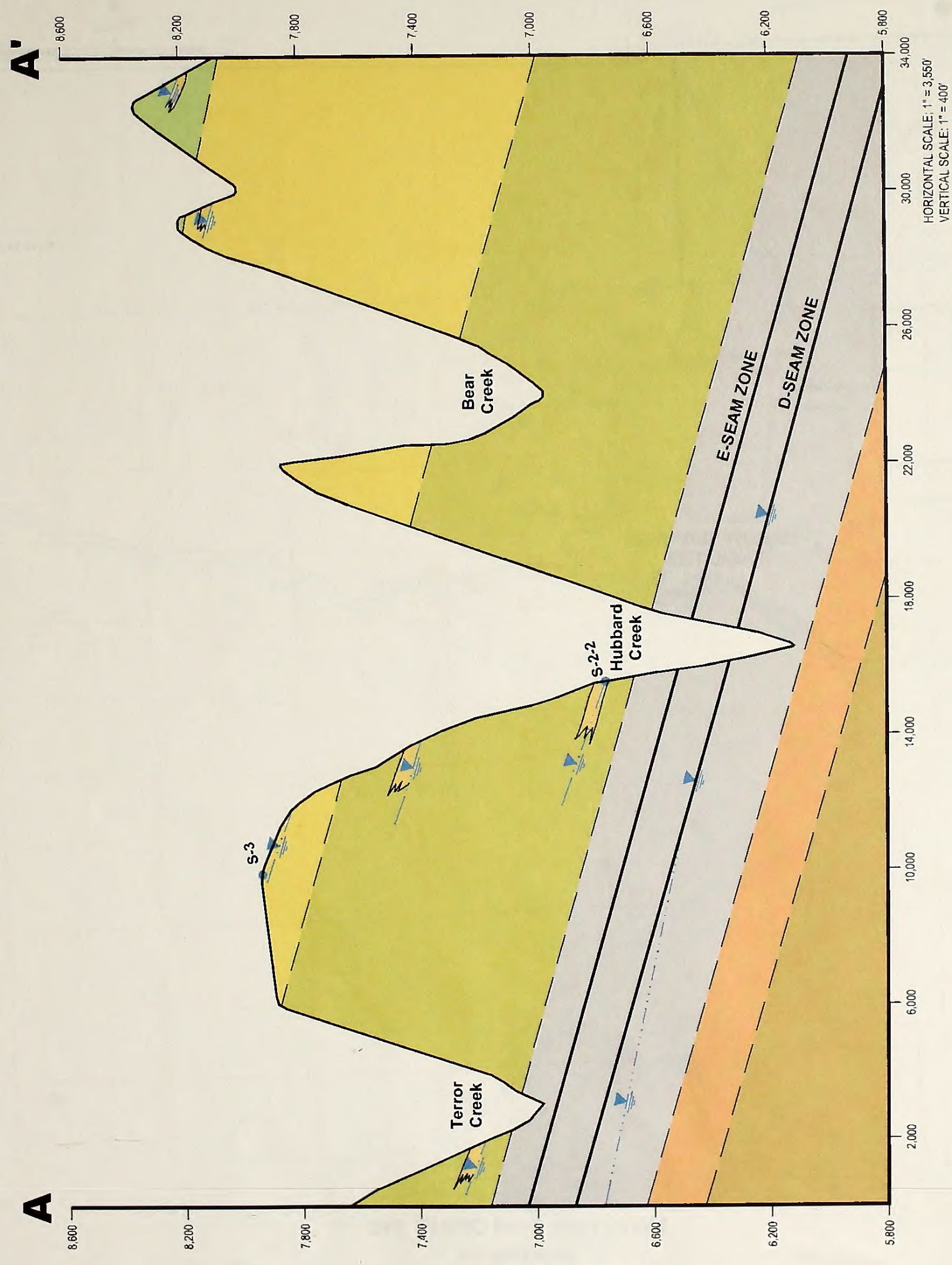
WATER RIGHTS KEY

WATER RIGHT NAME	LOCATION						MAP NUMBER
	TS	RNG	SEC	Q160	Q40	Q10	
Carter Ditch	12S	91W	24	NE	NW	SE	1
Bruce Park Reservoir	12S	91W	28	SW	SE	SE	2
Bruce Park Reservoir	12S	91W	28	SW	SE	SE	2
Blue Ribbon Ditch No.1	13S	91W	2	NW	NW	NE	3
Blue Ribbon Reservoir No.1	13S	91W	2	NW	NW	SE	4
Blue Ribbon Well	13S	91W	2	NW	NW	NE	5
J & M Spring & PL No.2	13S	91W	3	NW	SW	SW	6
J & M Spring & PL No.1	13S	91W	4	NE	NE	SW	7
Deer Trail Ditch	13S	91W	11	NE	SW	NW	8
Deer Trail Ditch	13S	91W	11	NE	SW	NW	8
Deer Trail Ditch	13S	91W	11	NE	SW	NW	8
Deer Trail Ditch	13S	91W	11	NE	SW	NW	8
Deer Trail Ditch	13S	91W	11	NE	SW	NW	8
Deer Trail Ditch	13S	91W	11	NE	SW	NW	8
Majnik Ditch	13S	91W	14	NE	NW	NE	9
Mayes Ditch	13S	91W	14	NE	NE	NE	10
TERROR CREEK							
Grand Mesa Canal HGT 3	12S	91W	29	SE	NE	SW	11
Garvin Mesa Pipeline CD.	12S	91W	32	SW	NE	NW	12
Hughes Pipeline	12S	91W	32	SW	SW	SE	13
J & M Spring & PL No.3	13S	91W	4	NW	SW	SE	14
J & M Spring & PL No.4	13S	91W	4	NE	SW	NW	15
J & M Spring & PL No.5	13S	91W	4	NW	SE	NW	16
Barrow Spring Pipeline	13S	91W	5	NW	SW	SW	17
Leonard Spring No.1	13S	91W	7	NE	SE	NE	18
Leonard Spring No.2	13S	91W	7	NE	SE	NE	19
Terror Ditch	13S	91W	17	NE	NE	SE	20
Terror Ditch	13S	91W	17	NE	NE	SE	20
Terror Ditch	13S	91W	17	NE	NE	SE	20
Terror Ditch	13S	91W	17	NE	NE	SE	20
Fawcett Ditch	13S	91W	21	SW	NE	SW	21
Fawcett Ditch	13S	91W	21	SW	NE	NW	21
Holybee Ditch	13S	91W	21	NW	SW	SE	22
Fire Mountain Canal	13S	91W	21	SW	NW	NE	23
Pupik Pond	13S	91W	21	SW	NW	NE	24
Clouds Well	13S	91W	21	SE	SW	NW	25
NORTH FORK GUNNISON RIVER							
Fire Mountain Canal	13S	90W	8	SW	SW	SW	23
Fire Mountain Canal	13S	90W	8	SW	SW	SW	23
Fire Mountain Canal	13S	90W	8	SW	SW	SW	23
Somerset Mine Well	13S	91W	8	SE	SW		24
Bear Well No.1	13S	91W	8	SE	SE		25
Fire Mountain Canal	13S	90W	17	NW	NW	SW	23
Fire Mountain Canal	13S	90W	17	NW	NW	SW	23
Fire Mountain Canal	13S	90W	17	NW	NW	SW	23
Carroll Ditch	13S	91W	18	NW			26
New Majnik House Well	13S	91W	14	NE	SE	SE	27
Sell No.1 Well	13S	91W	14	NE	SE	SE	28
Jenkins Ditch No.1	13S	91W	15	SW	SW	SE	29
Jenkins Ditch No.1	13S	91W	15	SW	SW	SE	29
Jenkins Ditch No.2	13S	91W	15	SW	SE	NW	30
Jenkins Ditch No.2	13S	91W	15	SW	SE	NW	30
Stewart Ditch	13S	91W	15	SW	SE	SE	31
Bronish No.1 Well	13S	91W	15	SE	NW	SE	32
Stephens Ditch	13S	91W	21	SE	SE	SE	33
Stephens Ditch	13S	91W	21	NW			33
Stephens Ditch	13S	91W	21	NW			33
Stephens Ditch	13S	91W	21	NW			33
Stephens Ditch	13S	91W	21	NW			33
Stephens Ditch	13S	91W	21	NW			33
Toltec Spring	13S	91W	21	SE	NW	NW	34
Train Loadout Well No.1	13S	91W	29	SE	NW	NE	35
BEAR CREEK							
Burtard Ditch	12S	90W	30	NW	SW	NW	36
HUBBARD CREEK							
Wade Allen Ditch	12S	91W	10	SE	NW	NE	37
Wade Allen Ditch	12S	91W	10	SE	NW	NE	37
Carl Gaplin Ditch	12S	91W	12	SW	SE	NW	38
Pilot Knob Ditch	12S	91W	12	SW	SW	SE	39
Hubbard Creek	12S	91W	14	SE	NW	NW	40
NON ADJUDICATED WELLS							
Peggy Seabloom Well	12S	91W	29	SW	NW		41
Clay King Well	13S	91W	6	NW	NW		42

North Fork Coal DRAFT EIS
FIGURE 18
WATER RIGHTS







EXPLANATION

- GROUND WATER LEVEL (Inferred)
- SANDSTONE (Undifferentiated)
- WASATCH FORMATION
- OHIO CREEK MEMBER
- BARREN MEMBER
- COAL BEARING MEMBER
- ROLLINS SANDSTONE MEMBER
- MANCOS FORMATION

NOTE:

(1). The Location of Cross-Section A-A' is shown on Figure 19, Groundwater Hydrology.

(2). The potentiometric surface for the D - seam is inferred.

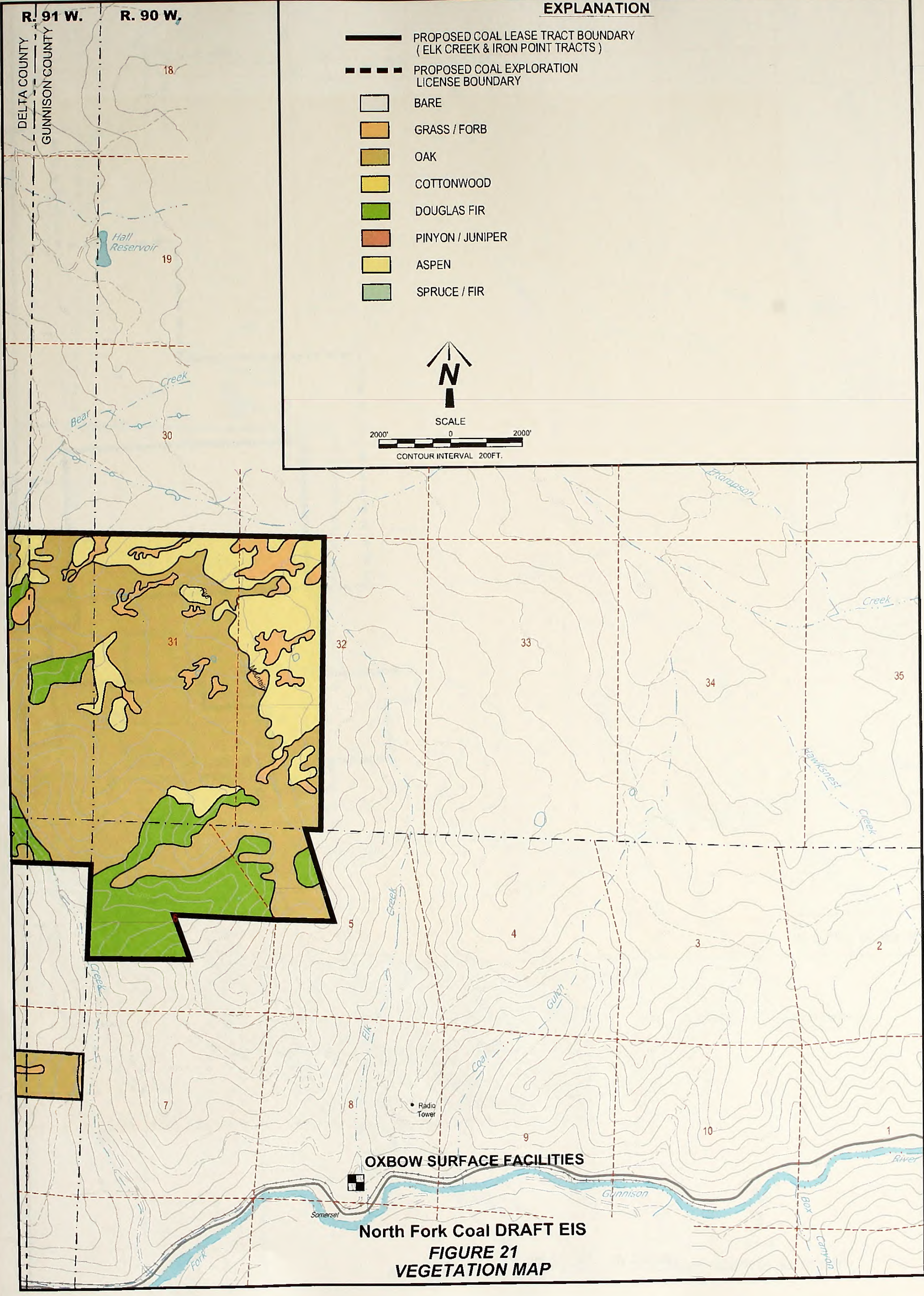
North Fork Coal DRAFT EIS

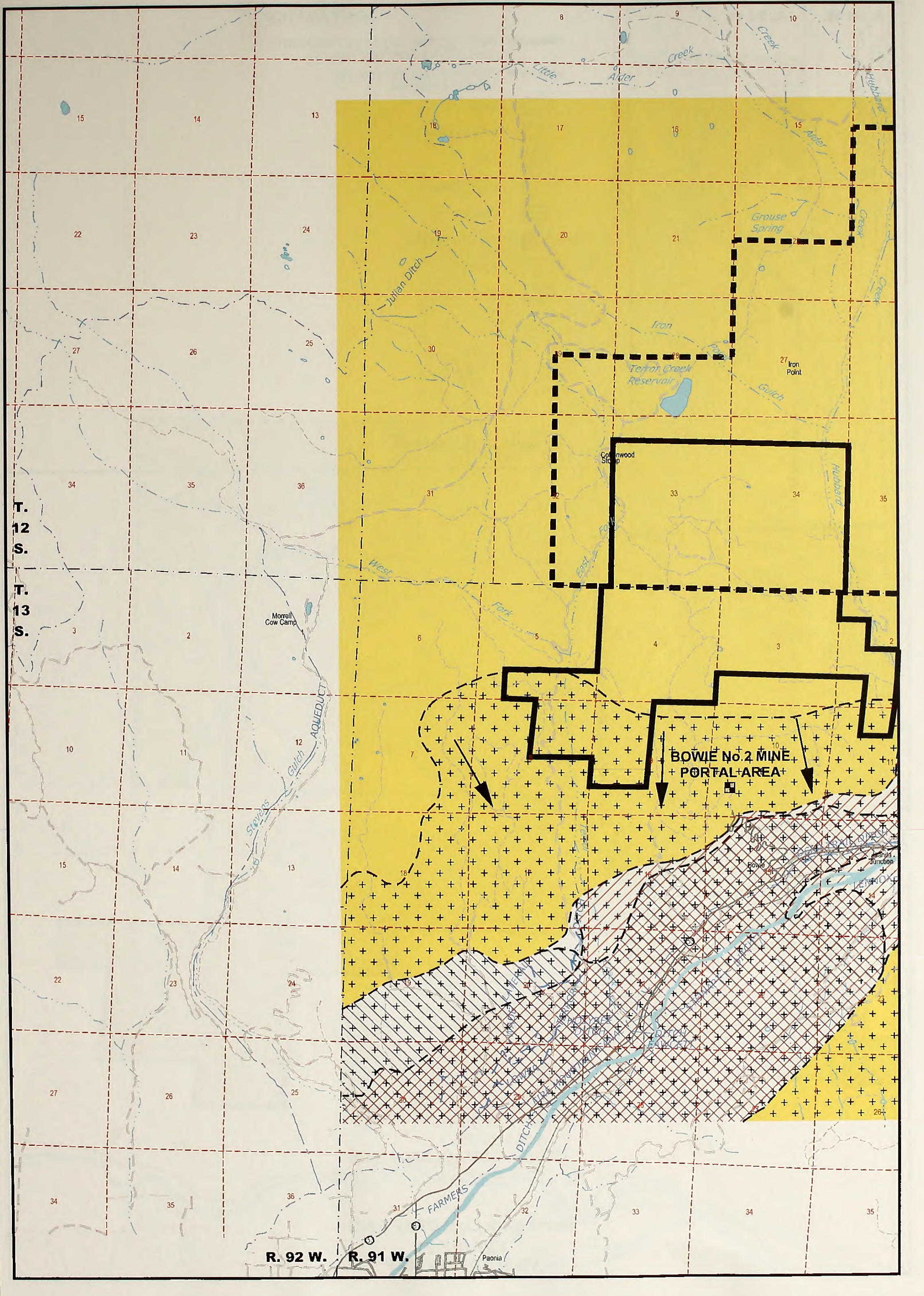
FIGURE 20

CONCEPTUAL HYDROGEOLOGIC CROSS-SECTION A-A'







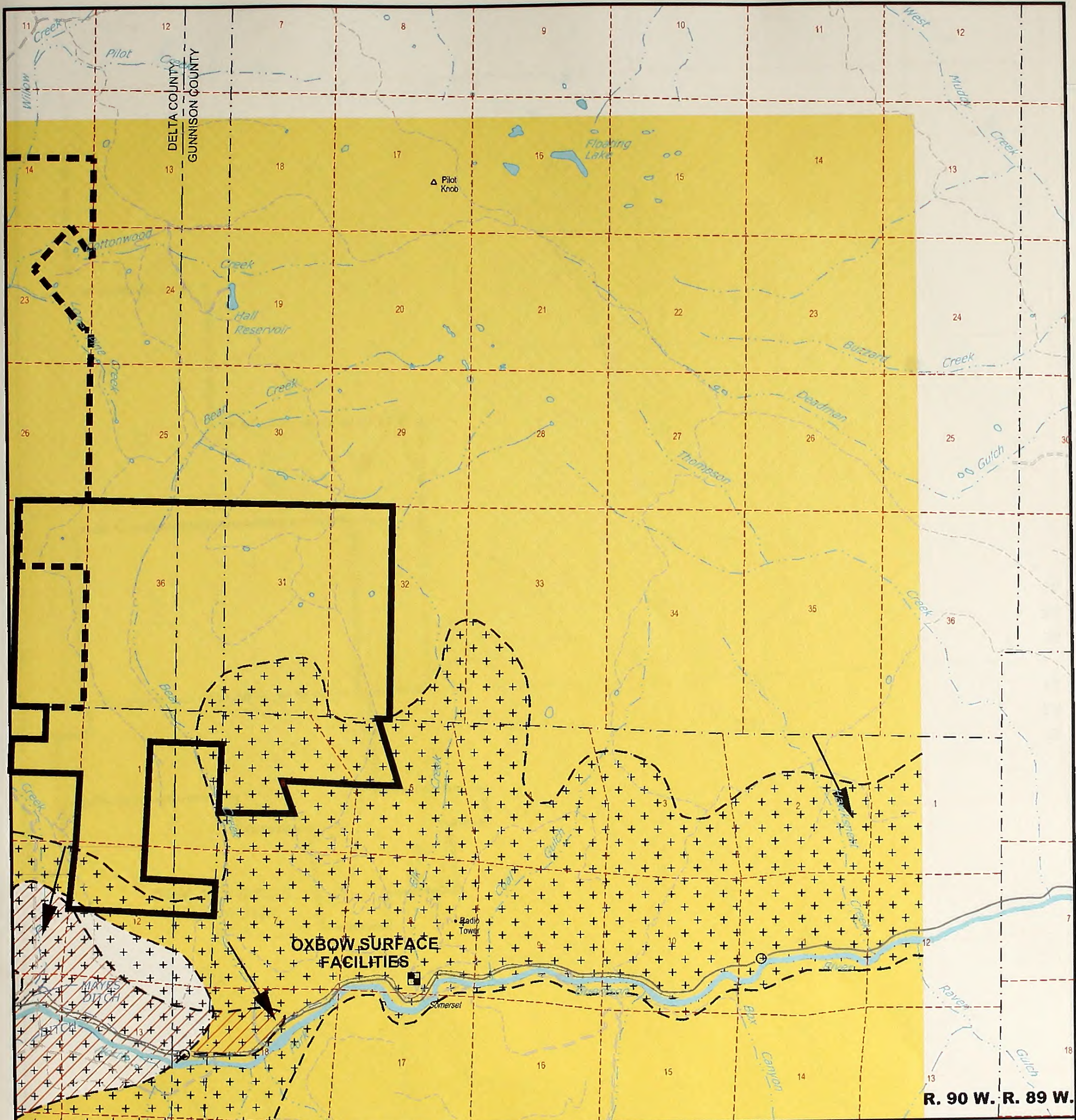


T.
12
S.

T.
13
S.

R. 92 W. R. 91 W.

**BOWIE No. 2 MINE
PORTAL AREA**

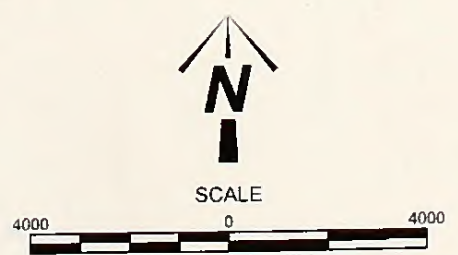


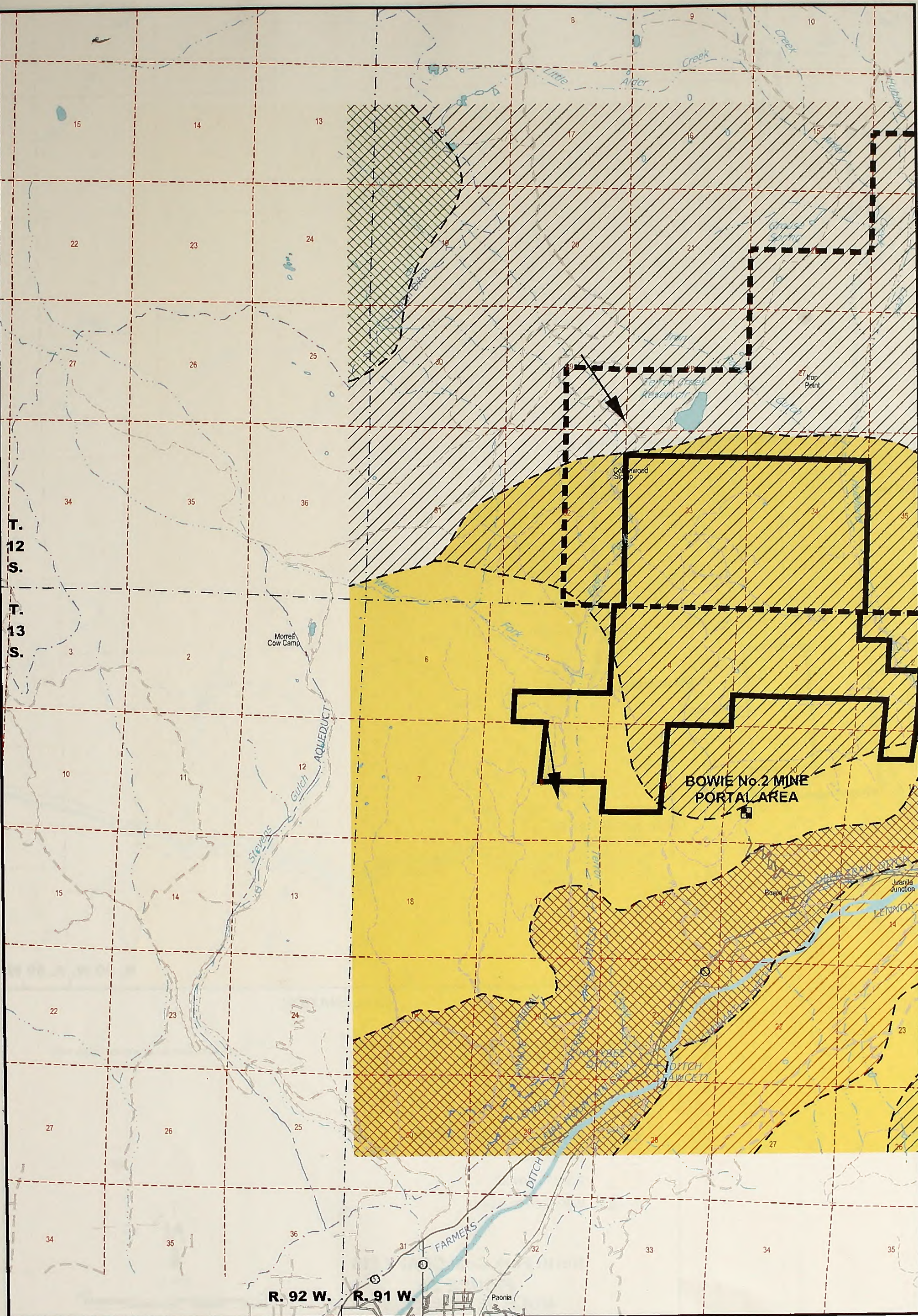
EXPLANATION

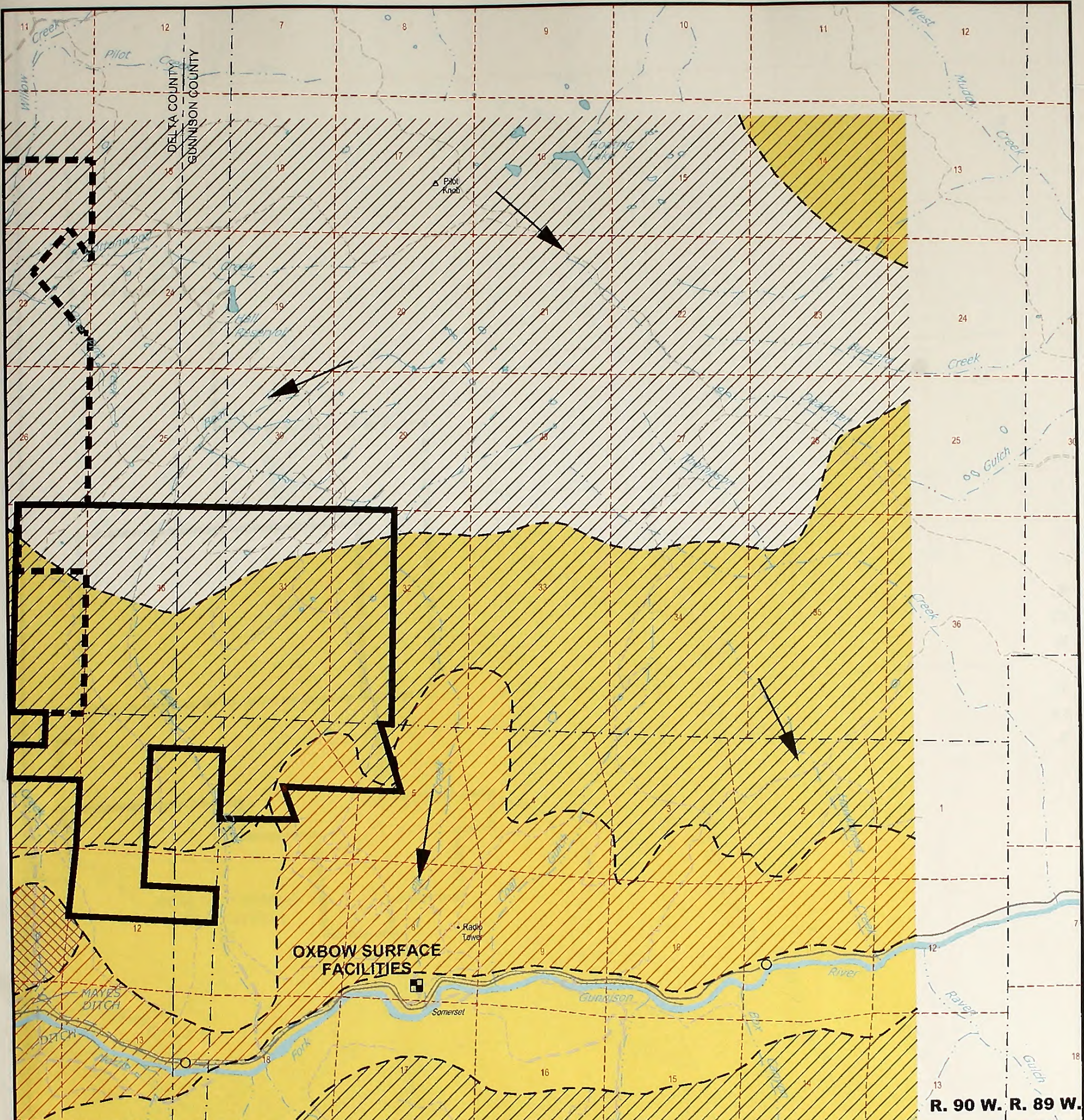
- PROPOSED COAL LEASE TRACT BOUNDARY
(ELK CREEK & IRON POINT TRACTS)
- PROPOSED COAL EXPLORATION
LICENSE BOUNDARY
- SEVERE WINTER RANGE
- WINTER CONCENTRATION AREAS
- WINTER RANGE
- SUMMER RANGE
- MIGRATION PATTERN

NOTE:
(1). Source: Colorado Division of Wildlife (Update 1995).

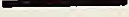







North Fork Coal DRAFT EIS
FIGURE 22
MULE DEER RANGE





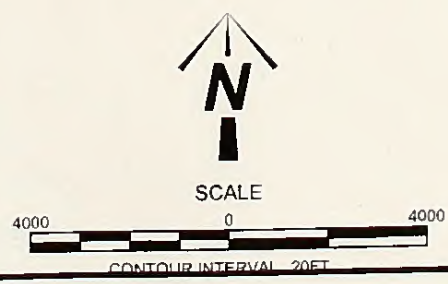


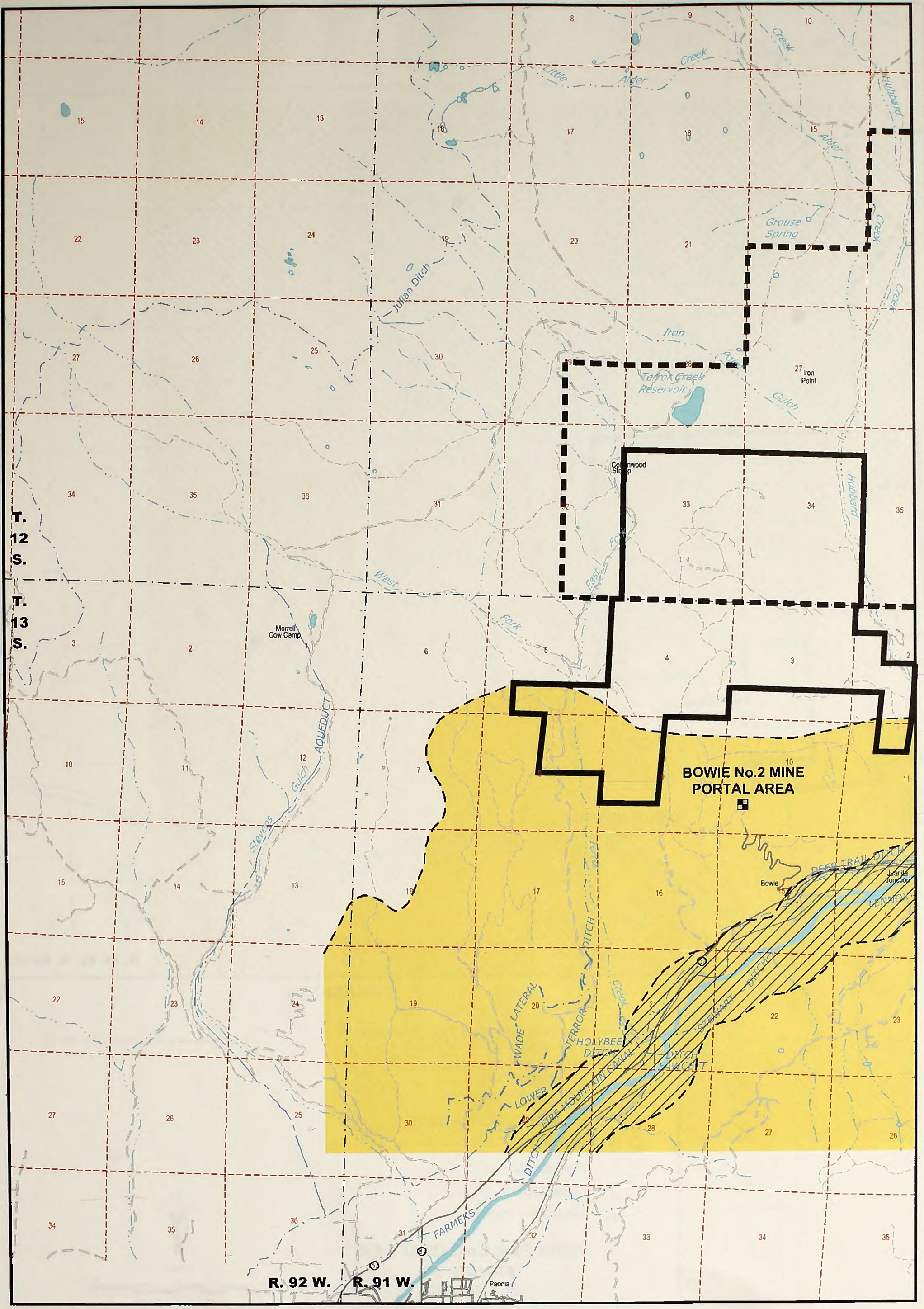
EXPLANATION

-  PROPOSED COAL LEASE TRACT BOUNDARY (ELK CREEK & IRON POINT TRACTS)
-  PROPOSED COAL EXPLORATION LICENSE BOUNDARY
-  SEVERE WINTER RANGE
-  WINTER CONCENTRATION AREAS
-  WINTER RANGE
-  PRODUCTION AREA
-  SUMMER RANGE
-  MIGRATION PATTERN

NOTE:
(1). Source: Colorado Division of Wildlife (Update 1995).

North Fork Coal DRAFT EIS
FIGURE 23
ELK RANGE



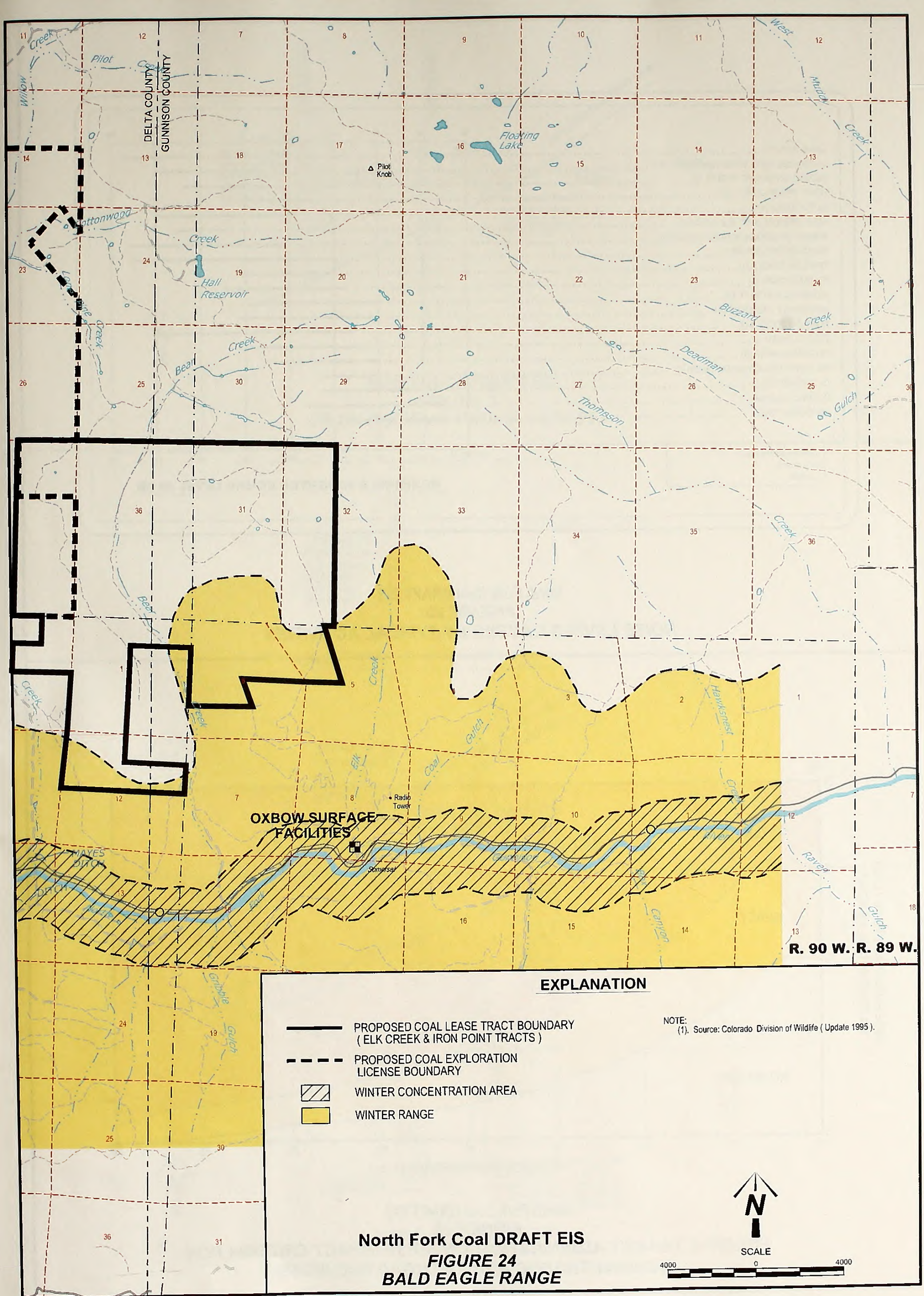


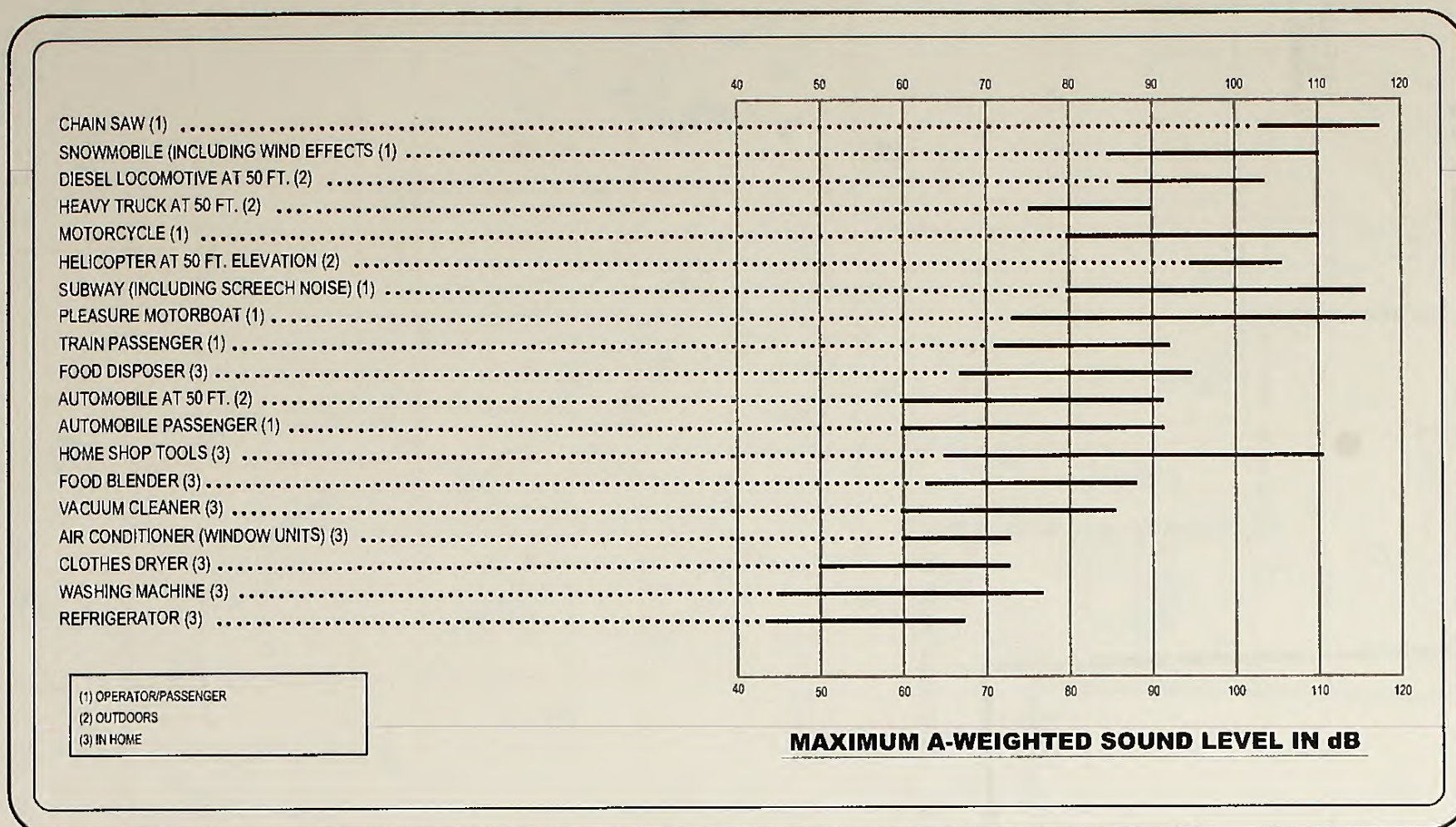
T.
12
S.

T.
13
S.

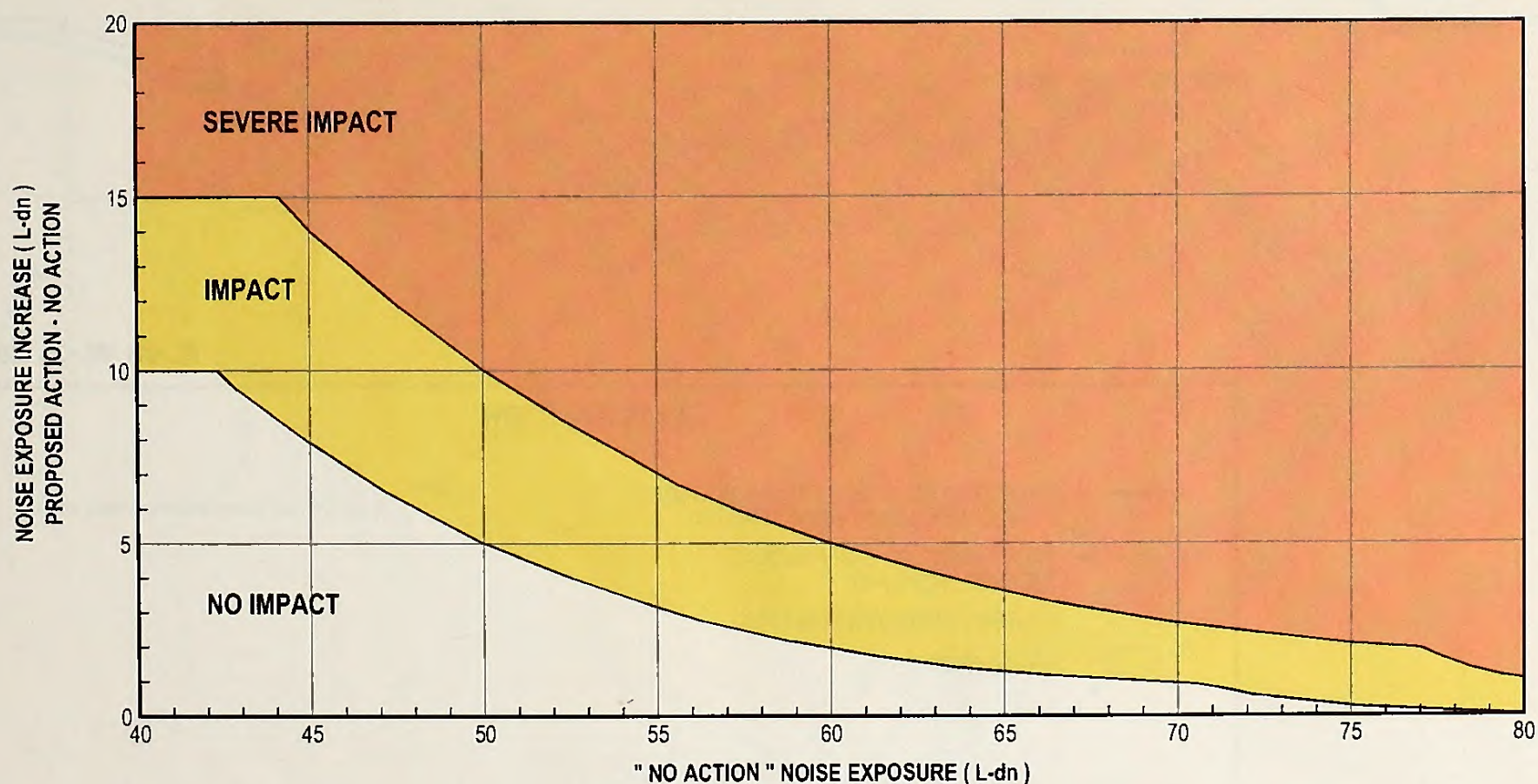
**BOWIE No. 2 MINE
PORTAL AREA**

R. 92 W. R. 91 W.

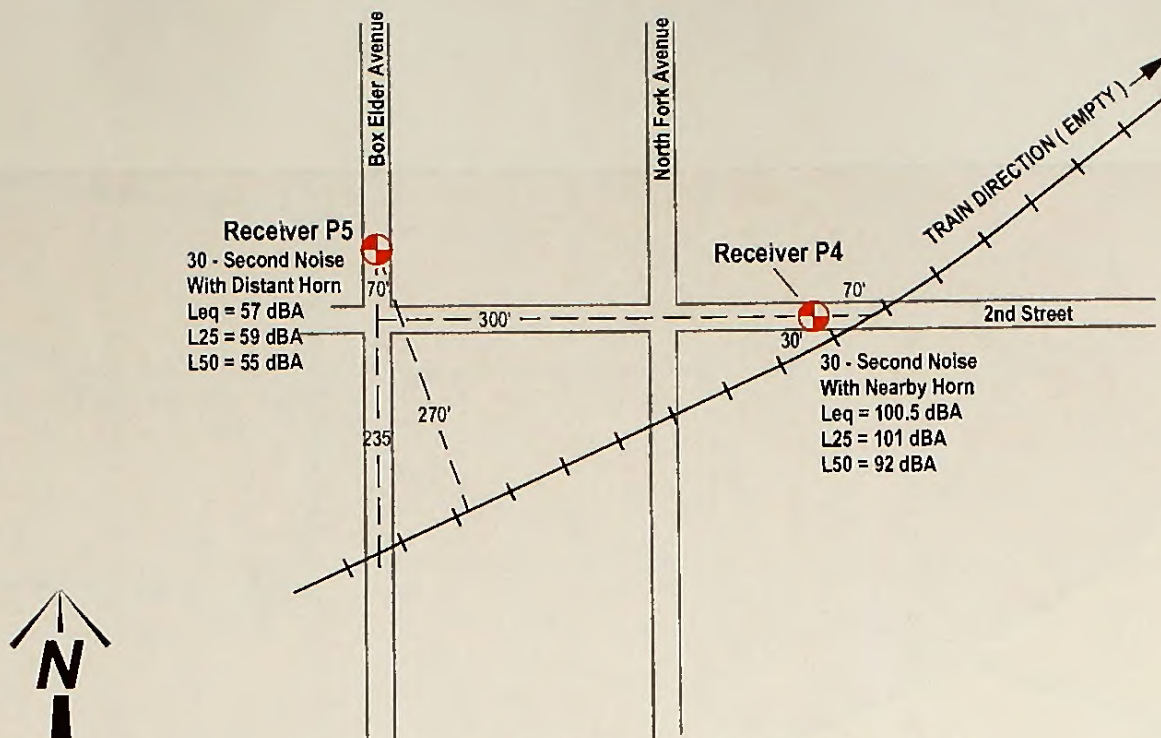




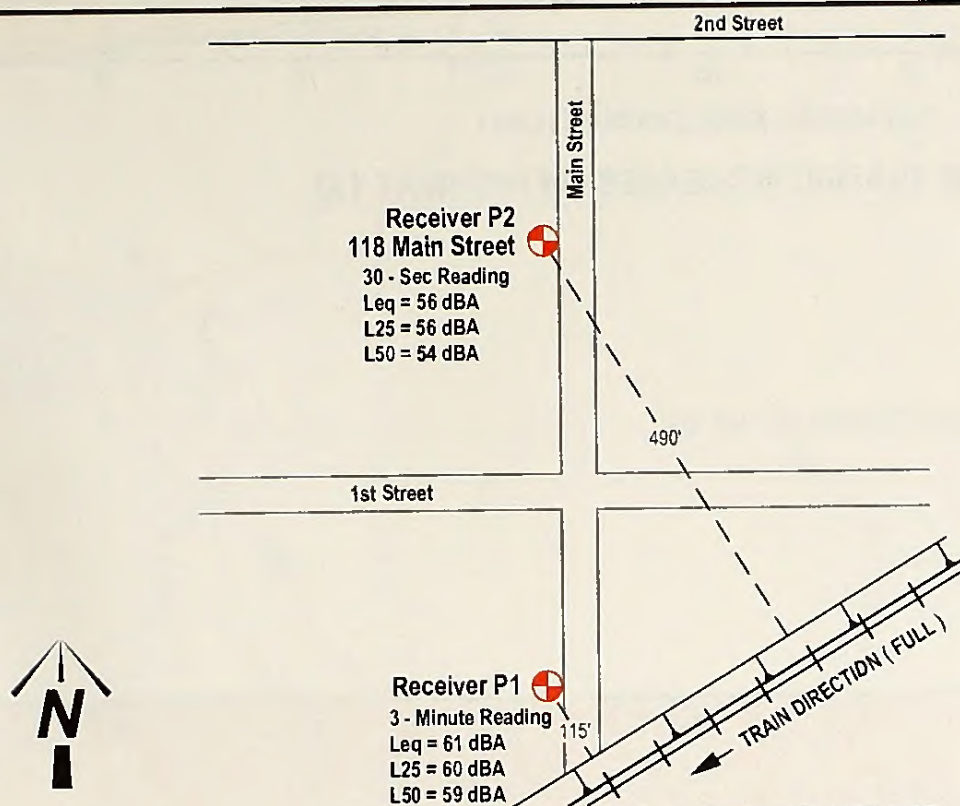
North Fork Coal DRAFT EIS
FIGURE 25
NOISE LEVELS CAUSED BY TYPICAL ACTIVITIES



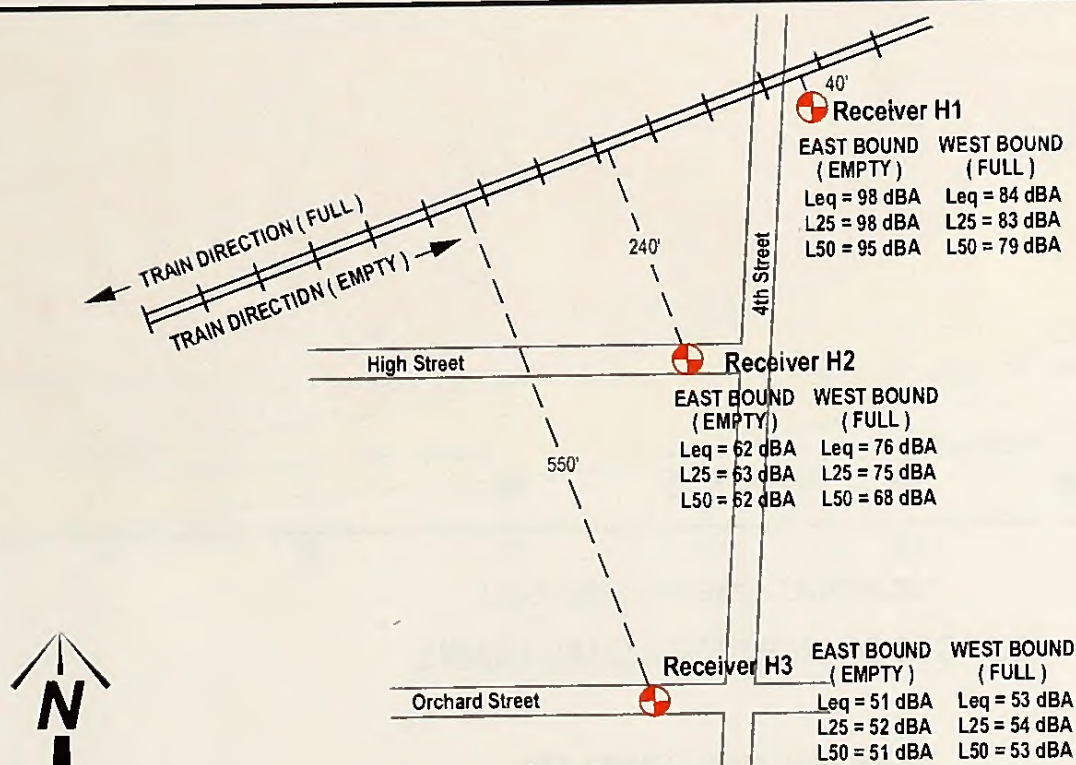
North Fork Coal DRAFT EIS
FIGURE 26
**FEDERAL TRANSIT ADMINISTRATION NOISE IMPACT CRITERIA FOR
 HIGHWAY TRAFFIC AND RAILROAD PROJECTS**



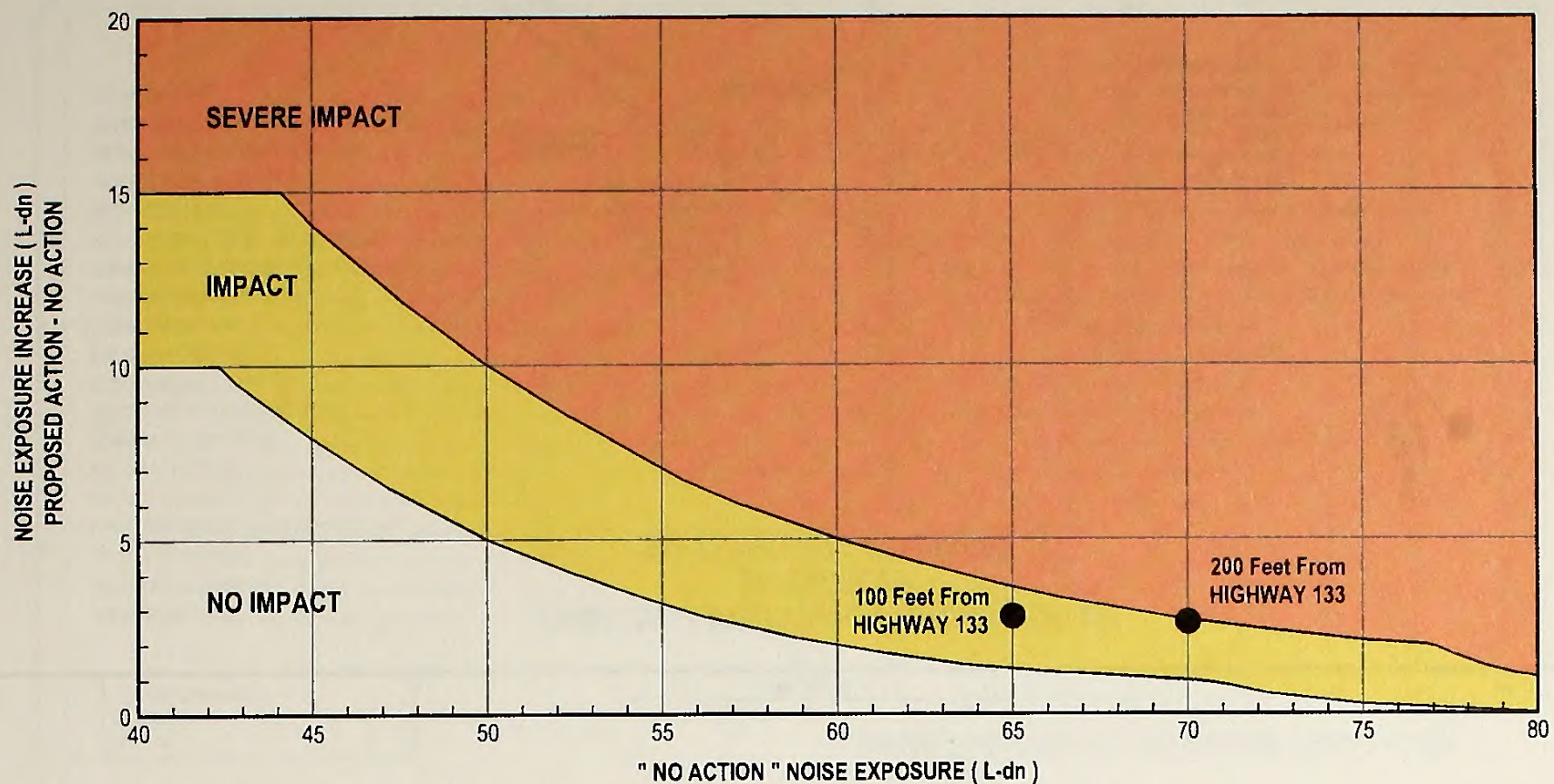
North Fork Coal DRAFT EIS
FIGURE 27
TRAIN NOISE AT PAONIA (4/21/99)



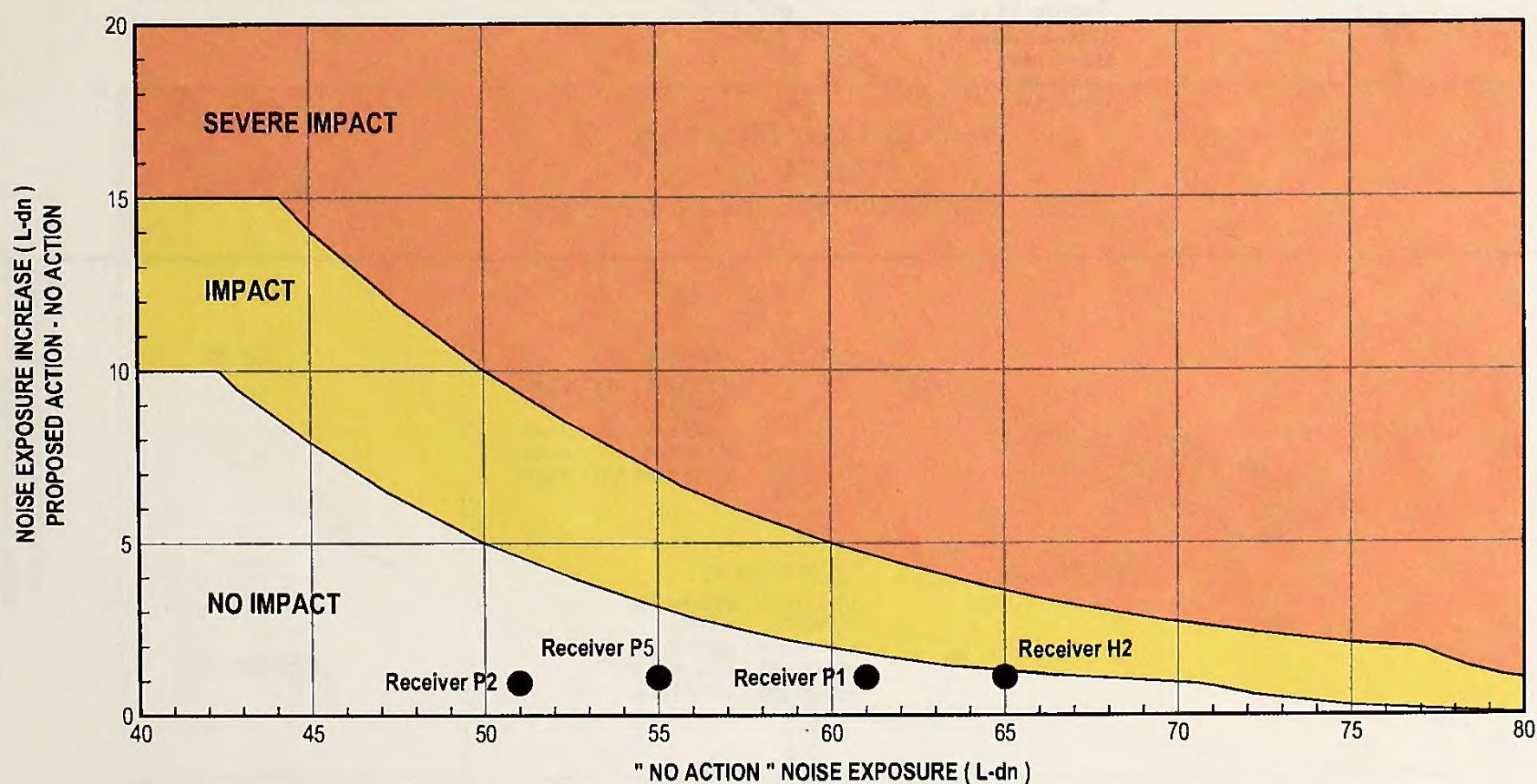
North Fork Coal DRAFT EIS
FIGURE 28
TRAIN NOISE AT PAONIA (4/25/99)



North Fork Coal DRAFT EIS
FIGURE 29
TRAIN NOISE AT HOTCHKISS (4/21/99 & 4/25/99)

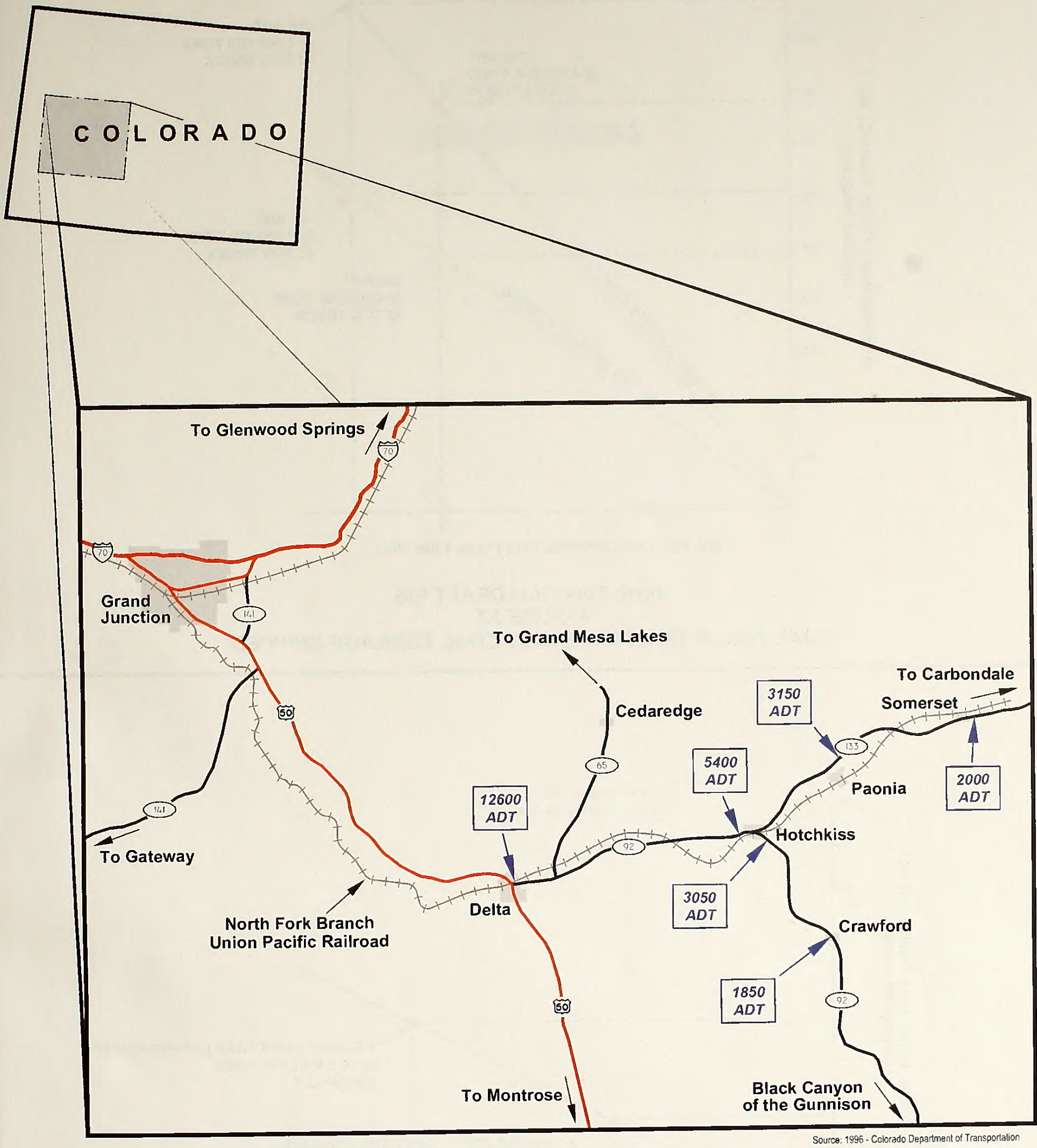


IMPACTS OF TRAFFIC INCREASES ON HIGHWAY 133

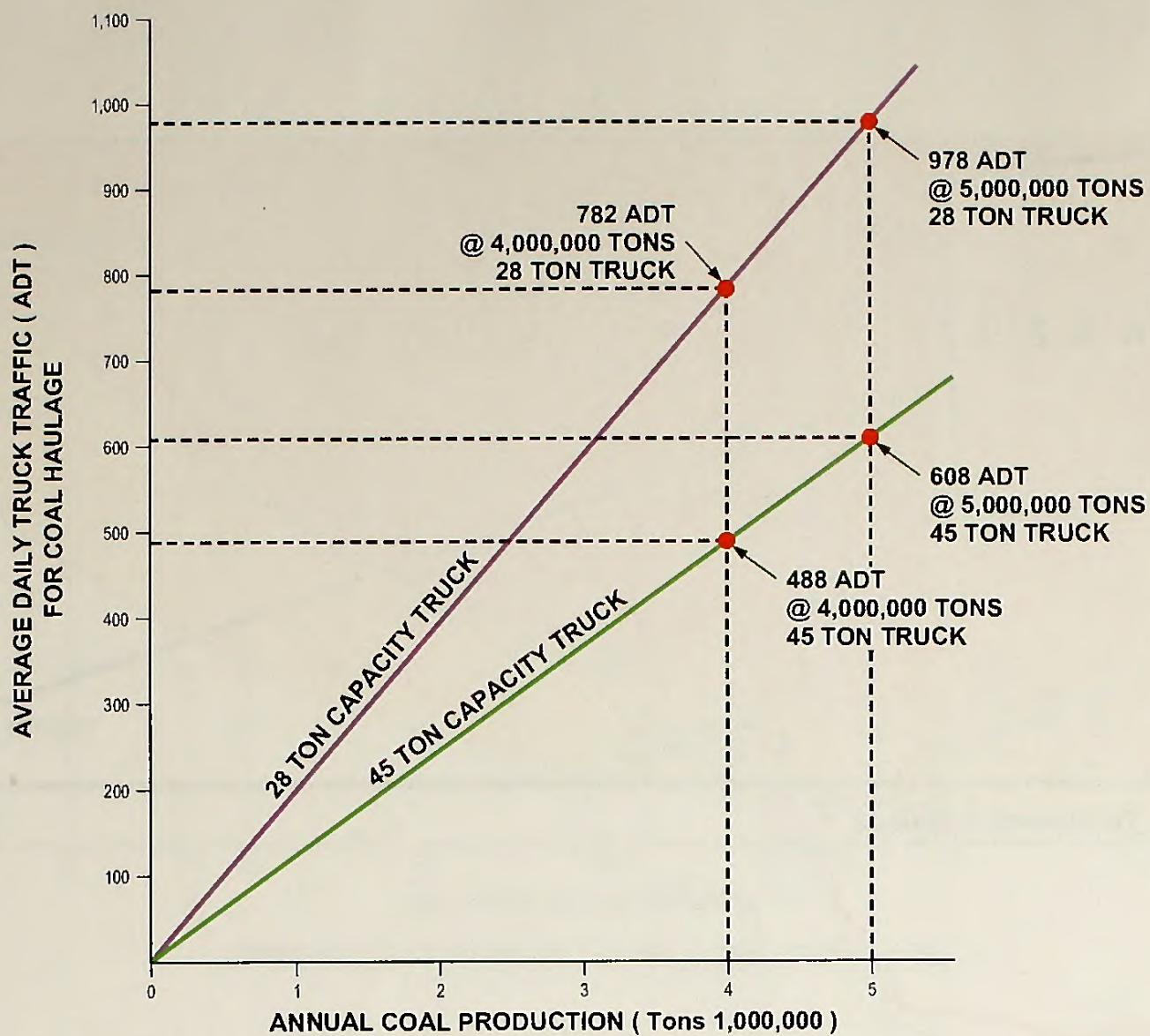


IMPACTS OF INCREASED COAL TRAINS

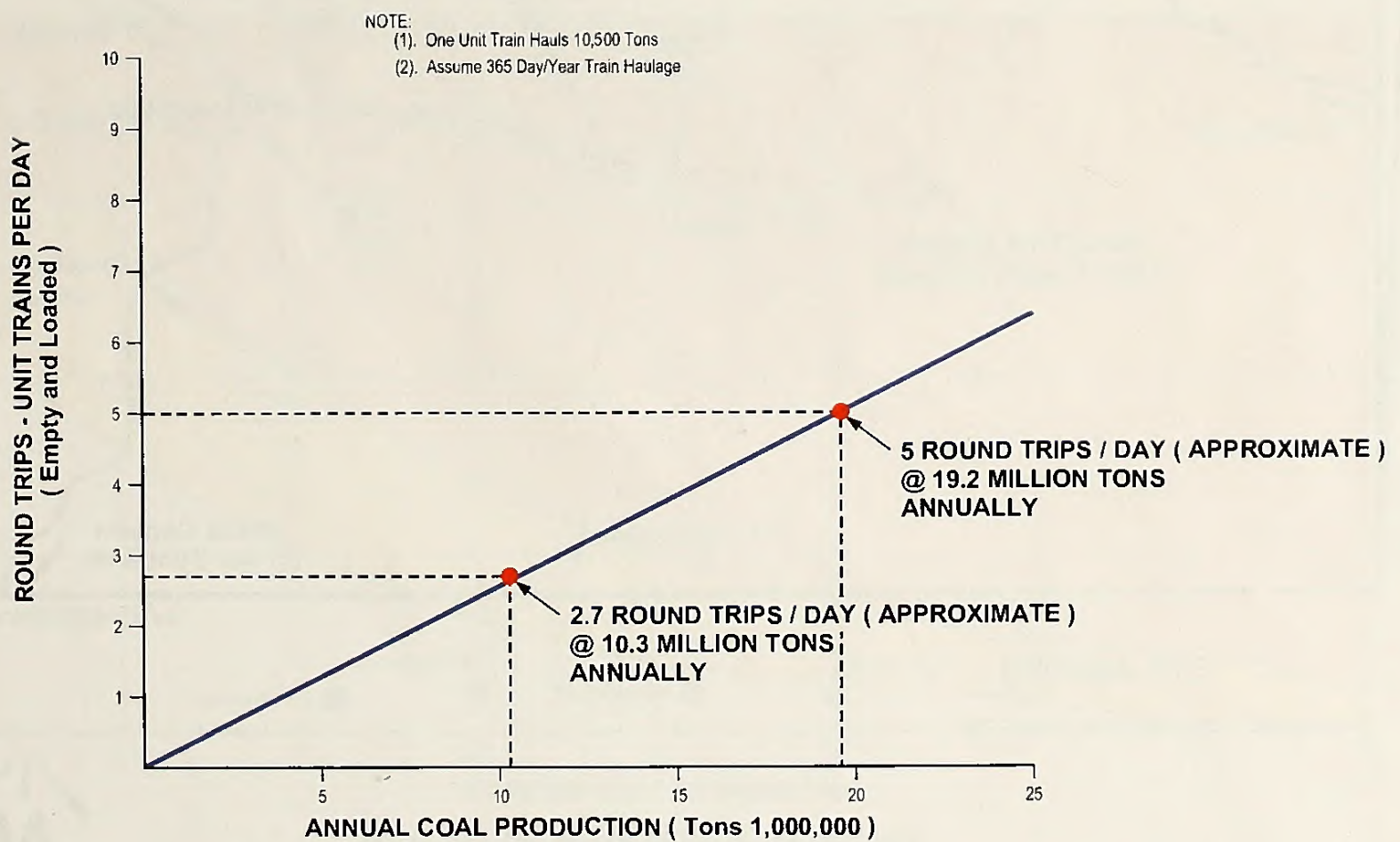
North Fork Coal DRAFT EIS
FIGURE 30
NOISE IMPACT DESCRIPTORS
USING FEDERAL TRANSIT ADMINISTRATION CRITERIA



North Fork Coal DRAFT EIS
 FIGURE 31
 RAIL AND ROAD SYTEMS



North Fork Coal DRAFT EIS
FIGURE 32
COAL TRUCK TRAFFIC VERSUS COAL TONNAGE SHIPPED

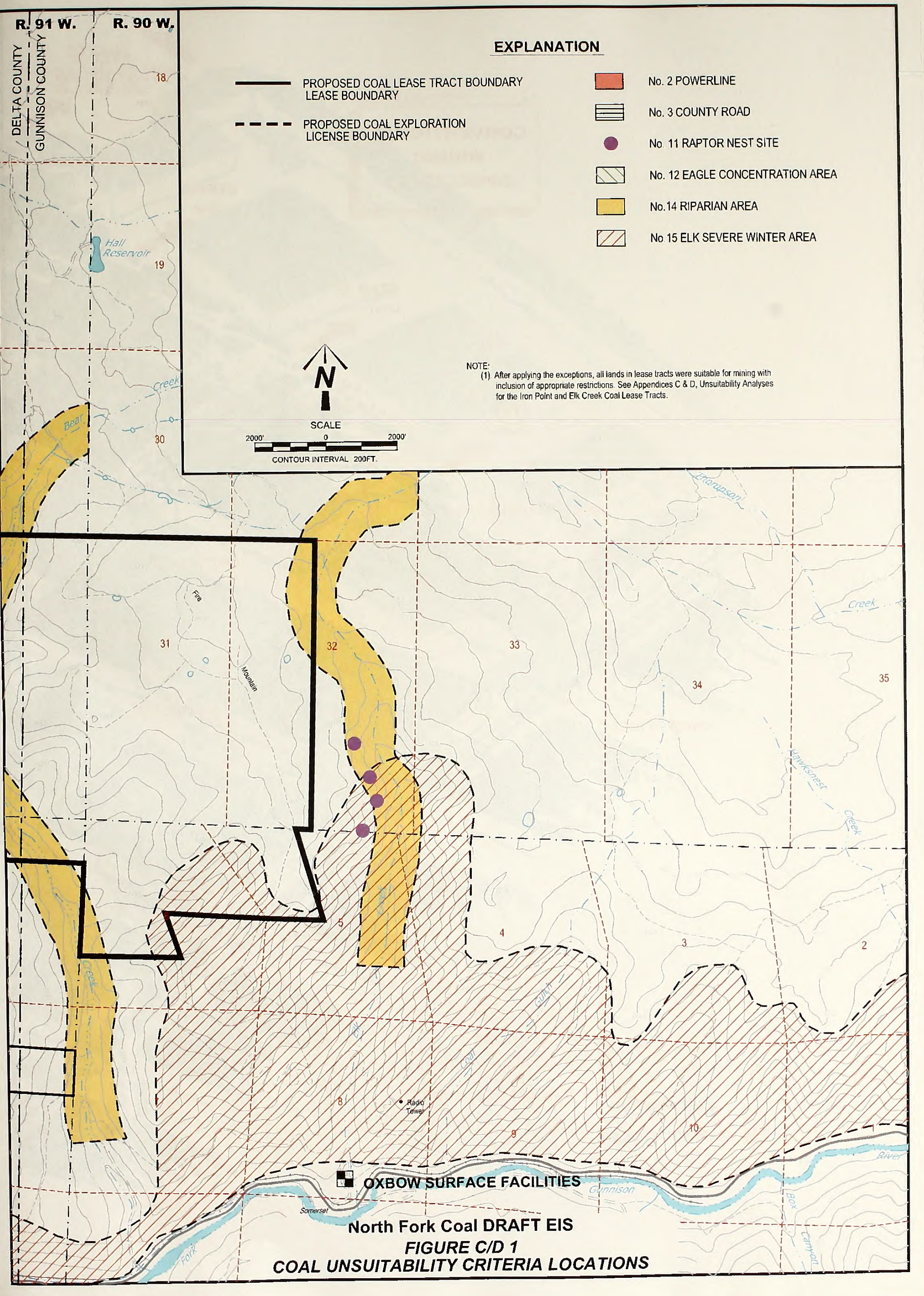


North Fork Coal DRAFT EIS
FIGURE 33
AVERAGE DAILY COAL TRAIN TRAFFIC FOR NORTH FORK BRANCH VERSUS ANNUAL COAL PRODUCTION

APPENDIX FIGURES



 **BOWIE No.2 MINE
PORTAL AREA**



R. 91 W. R. 90 W.
DELTA COUNTY
GUNNISON COUNTY

EXPLANATION

- PROPOSED COAL LEASE TRACT BOUNDARY
- PROPOSED COAL EXPLORATION LICENSE BOUNDARY
- No. 2 POWERLINE
- No. 3 COUNTY ROAD
- No. 11 RAPTOR NEST SITE
- No. 12 EAGLE CONCENTRATION AREA
- No. 14 RIPARIAN AREA
- No. 15 ELK SEVERE WINTER AREA



SCALE
2000' 0 2000'
CONTOUR INTERVAL 200FT.

NOTE:
(1) After applying the exceptions, all lands in lease tracts were suitable for mining with inclusion of appropriate restrictions. See Appendices C & D, Unsuitability Analyses for the Iron Point and Elk Creek Coal Lease Tracts.

OXBOW SURFACE FACILITIES

North Fork Coal DRAFT EIS
FIGURE C/D 1
COAL UNSUITABILITY CRITERIA LOCATIONS

**CONVENTIONAL
MINING
OPERATIONS**

STEP 2:
Load Drill Holes
with Explosives

STEP 3:
Blast

STEP 4:
Load Coal

STEP 5:
Roof Bolt

LOADING MACHINE


ROOF BOLTER MACHINE

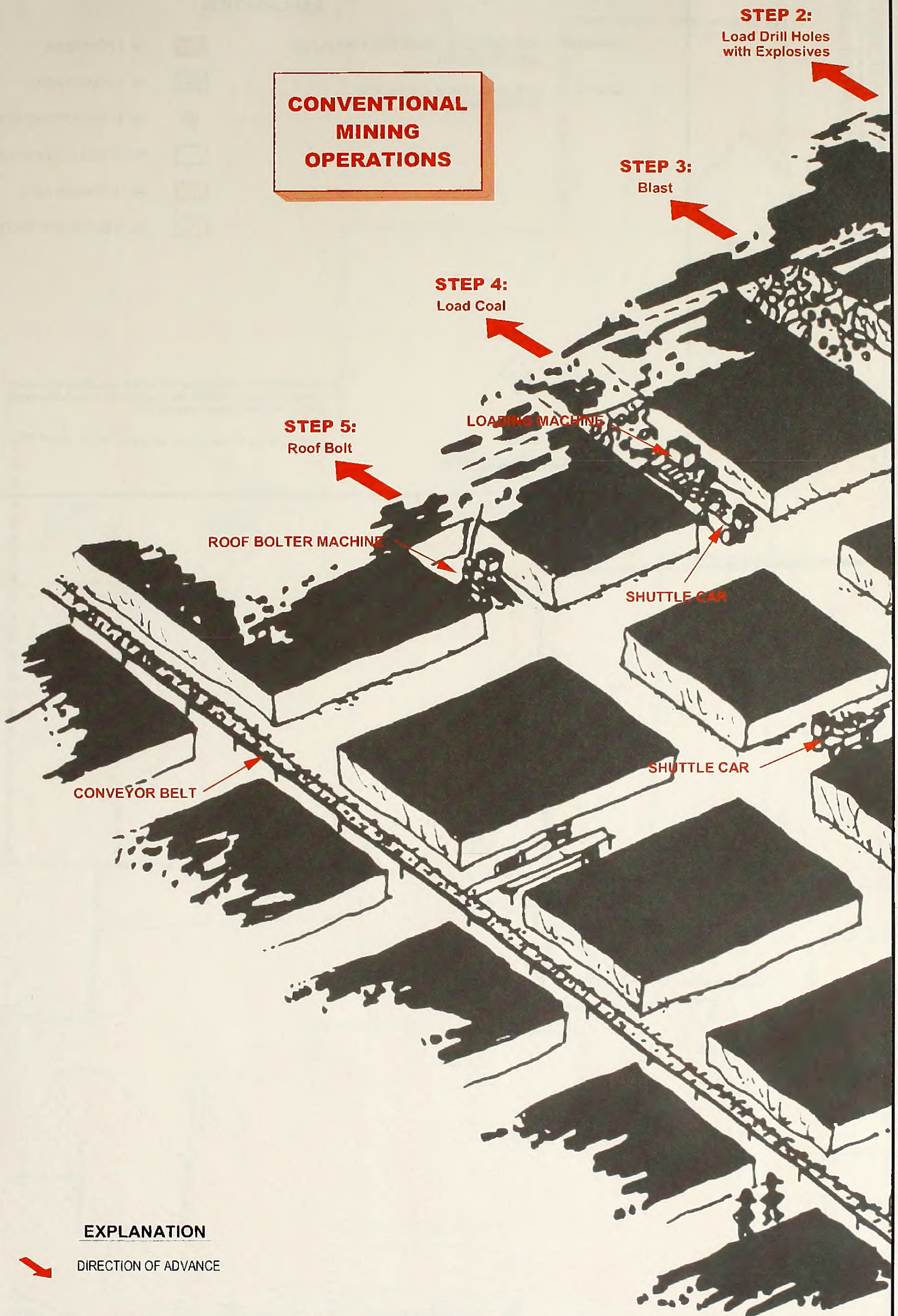
SHUTTLE CAR

SHUTTLE CAR

CONVEYOR BELT

EXPLANATION

 DIRECTION OF ADVANCE



Undercut Coal / Drill Holes for Explosives

CUTTING MACHINE

CONTINUOUS MINING MACHINE

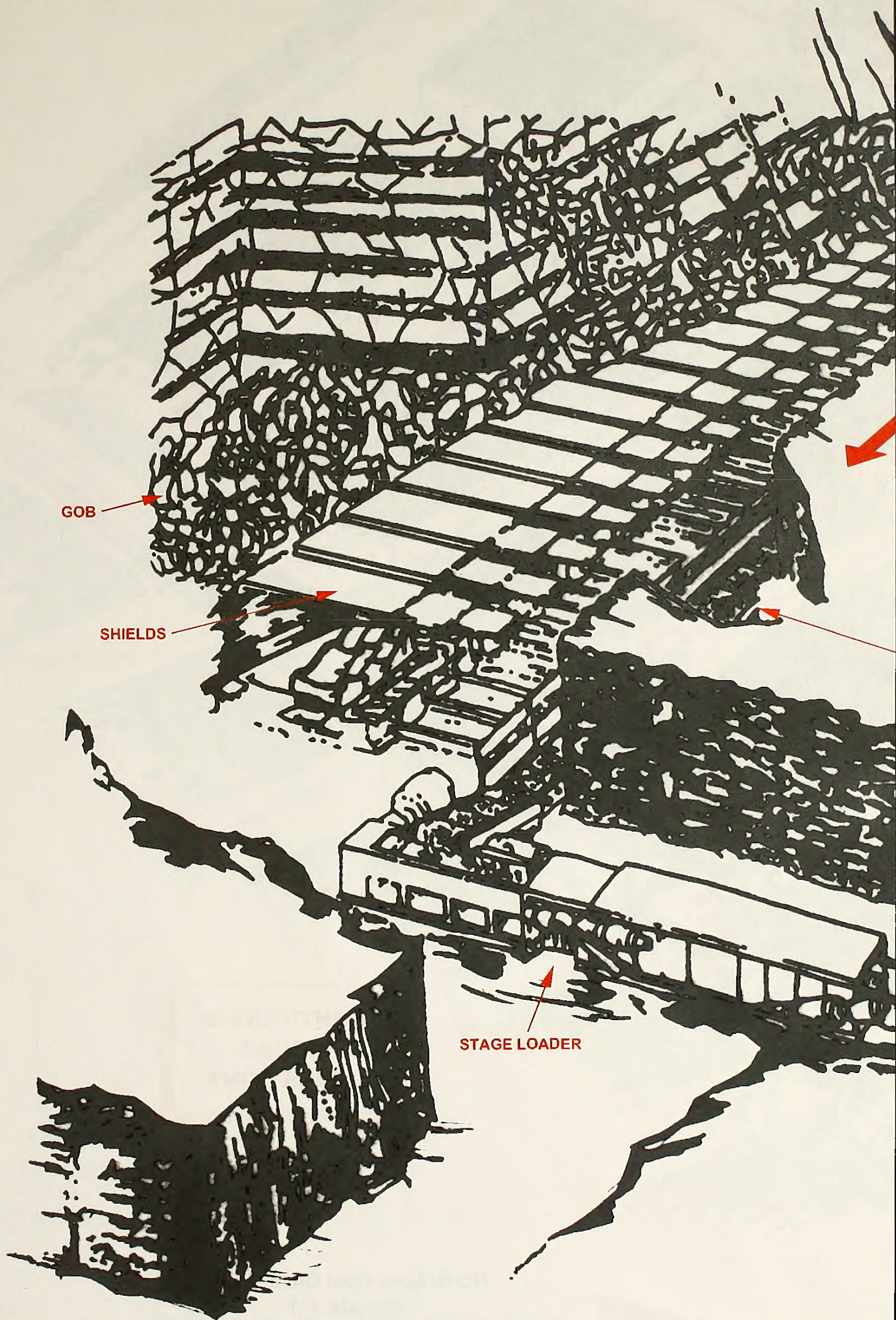
Cutting & Loading Coal

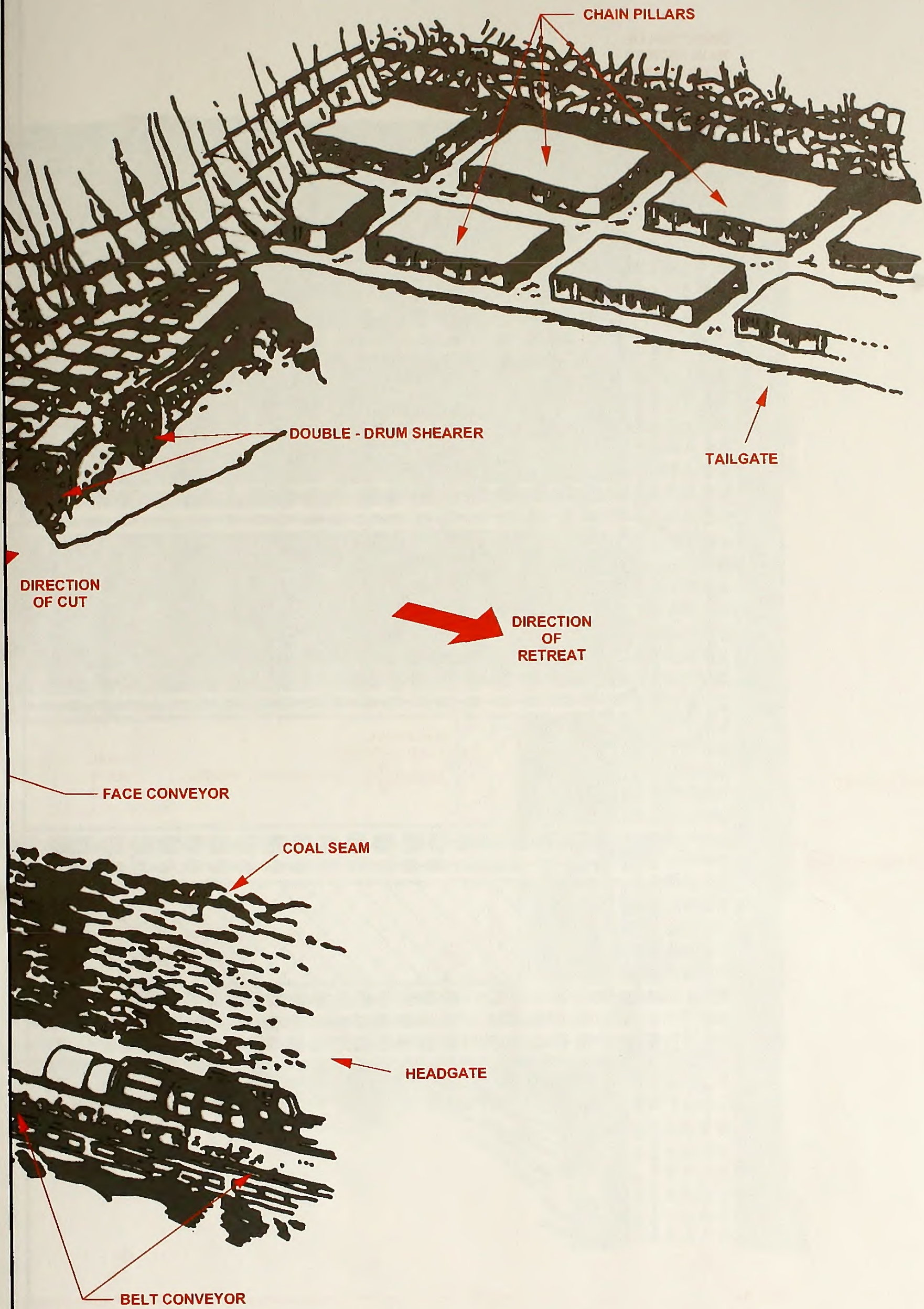
ROOF BOLTER MACHINE

STEP 1: Roof Bolt

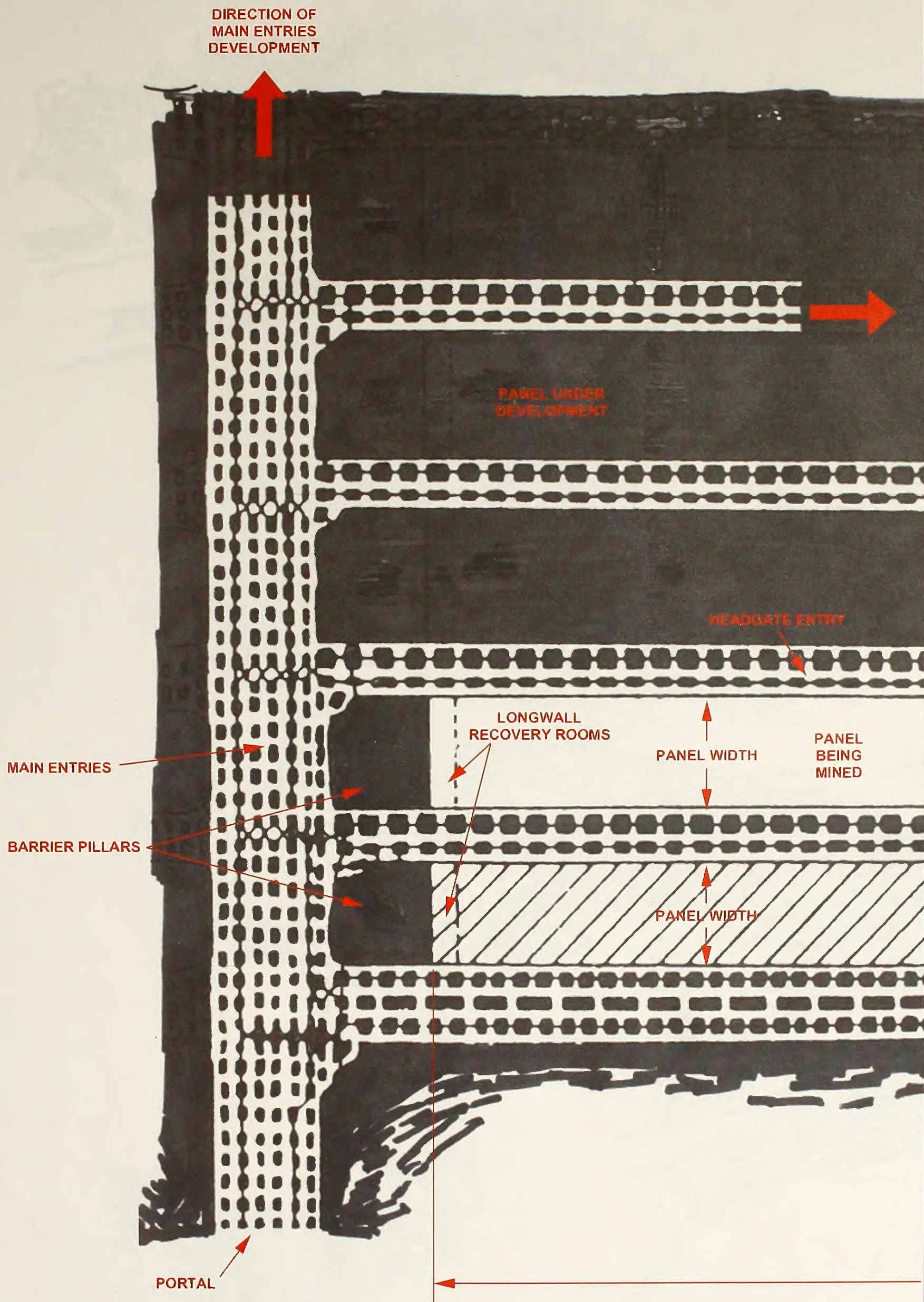
CONTINUOUS MINING OPERATIONS

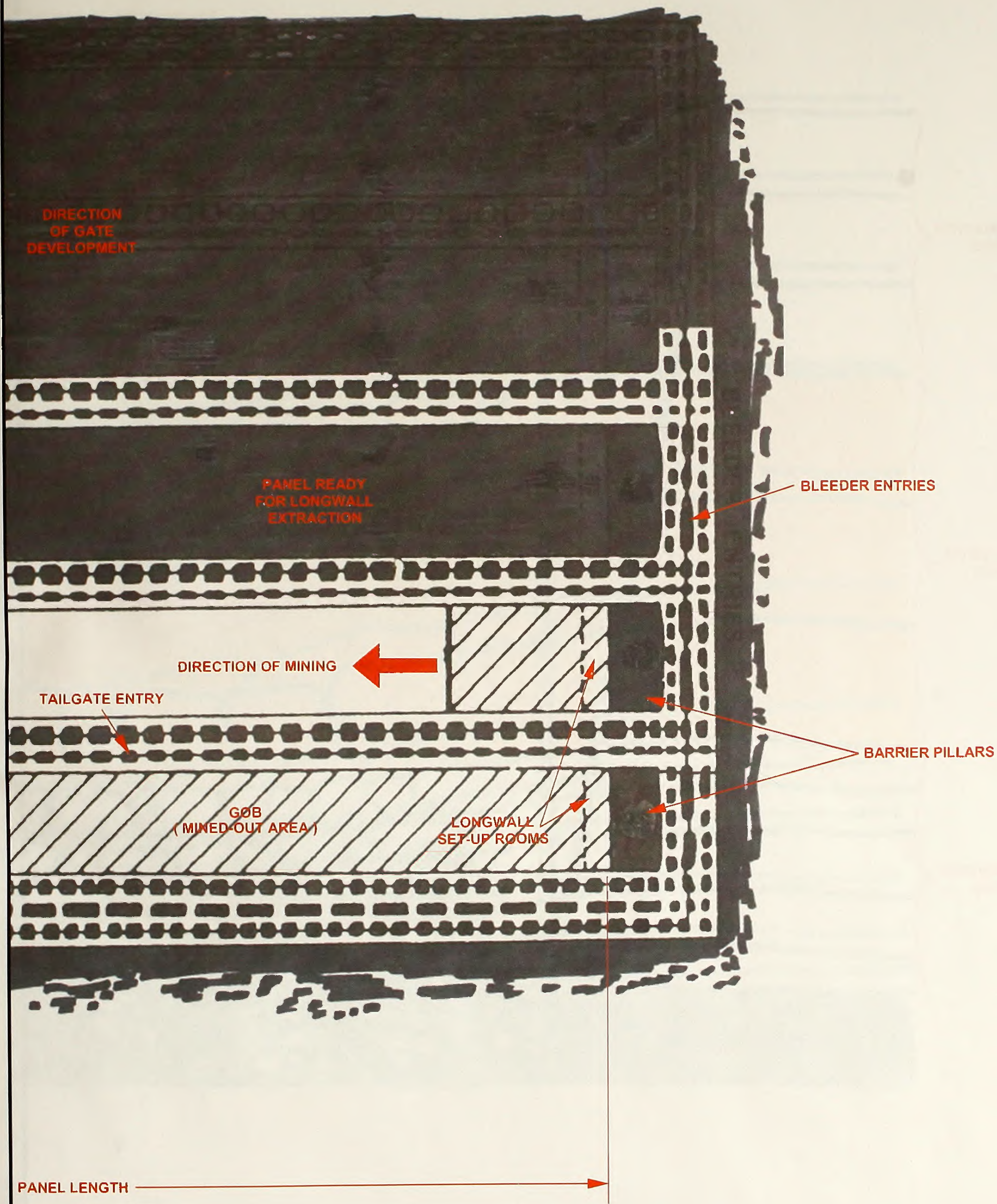
North Fork Coal DRAFT EIS
FIGURE F-1
CONCEPTUAL ROOM AND PILLAR MINING



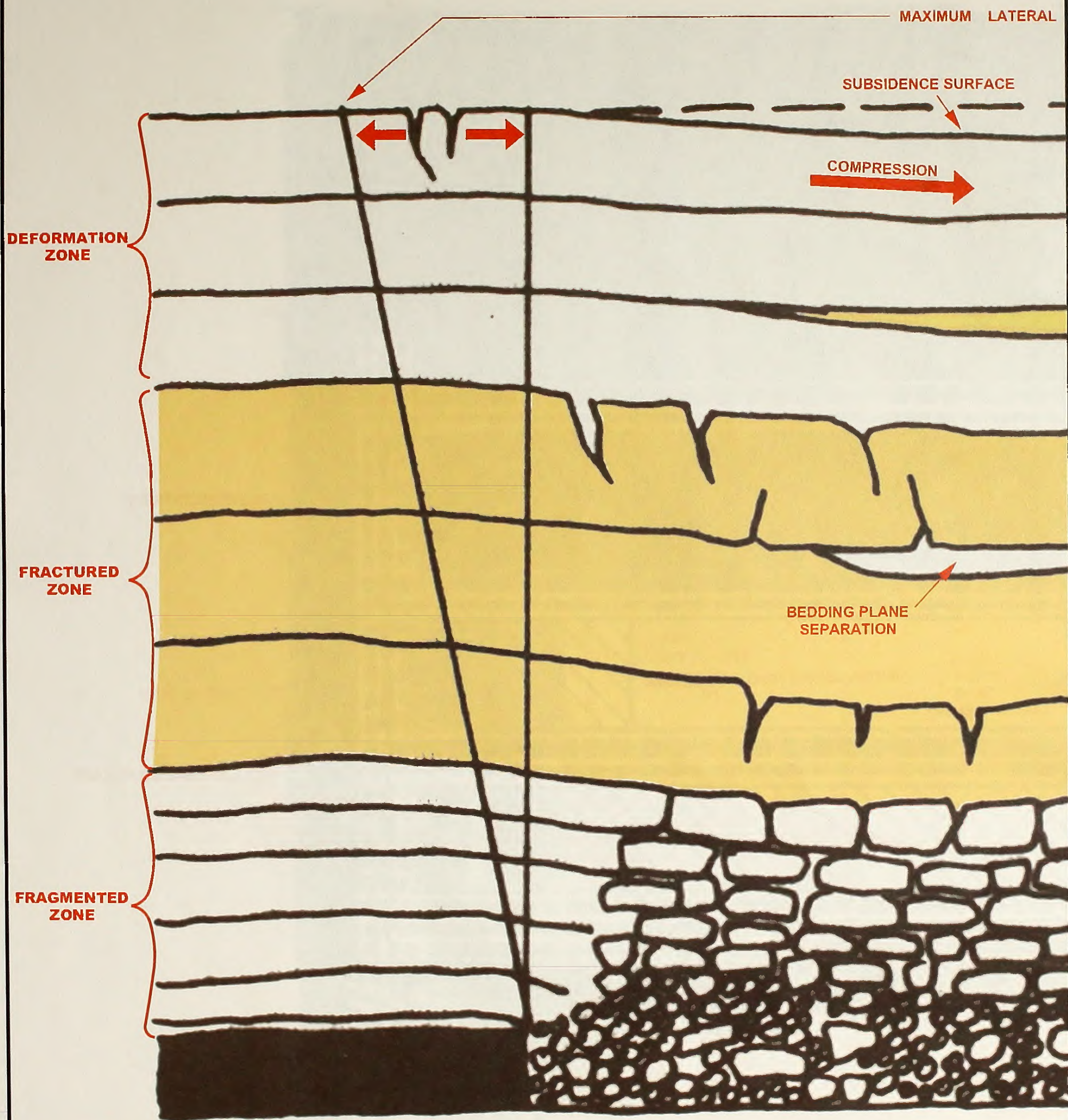


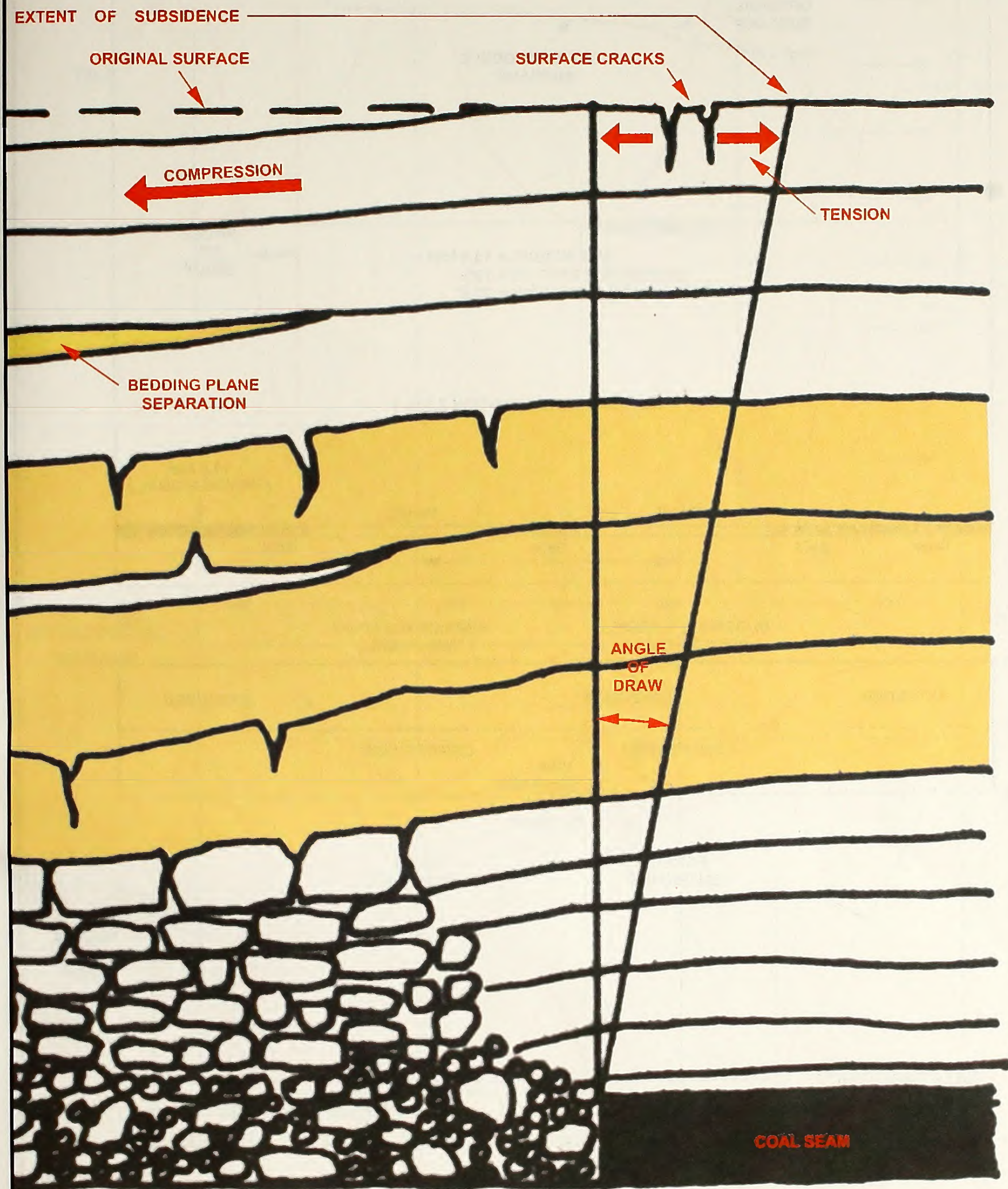
North Fork Coal DRAFT EIS
FIGURE F-2
CONCEPTUAL LONGWALL MINING





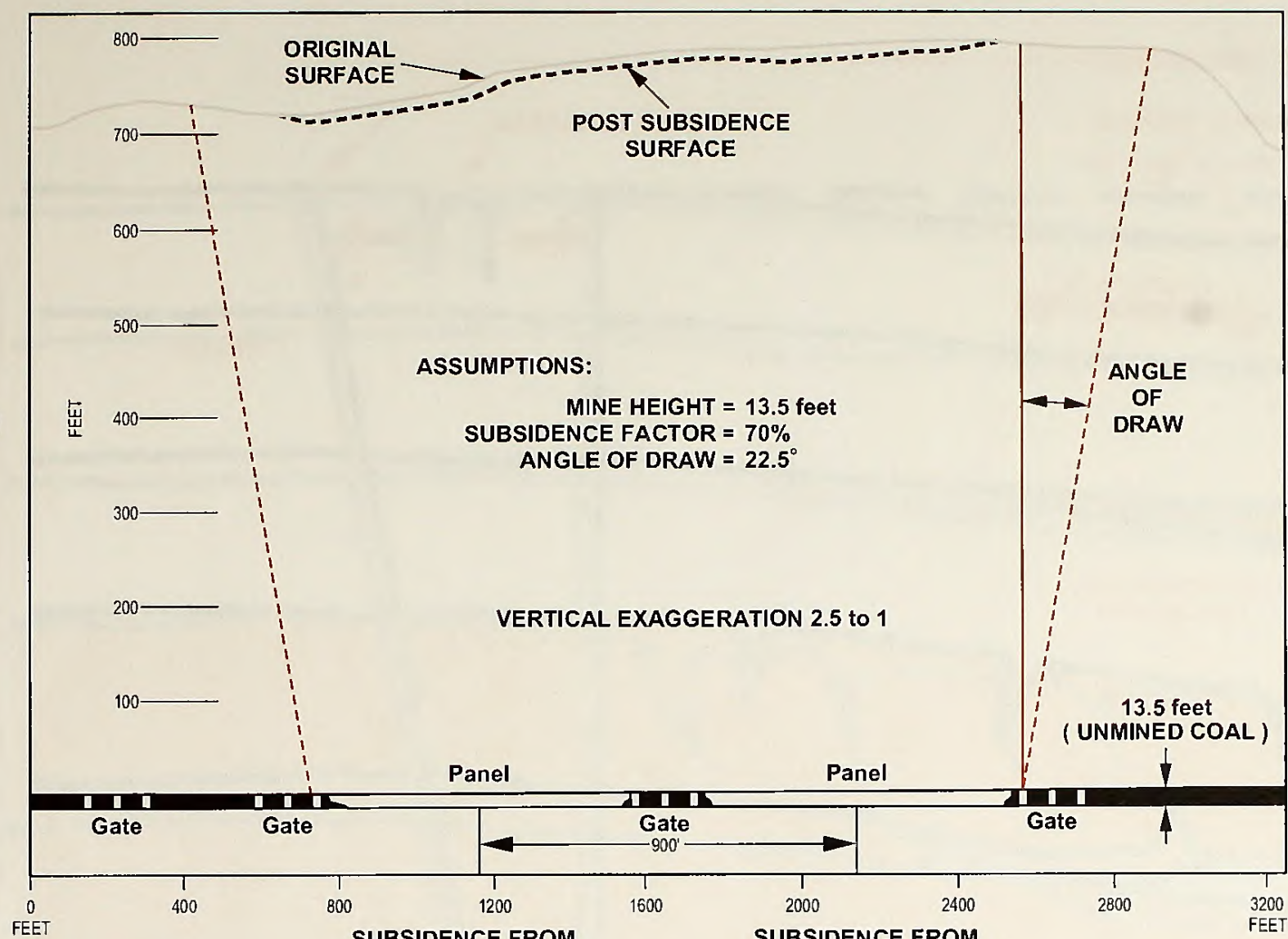
North Fork Coal DRAFT EIS
FIGURE F-3
TYPICAL LONGWALL PANEL LAYOUT IN THE UNITED STATES



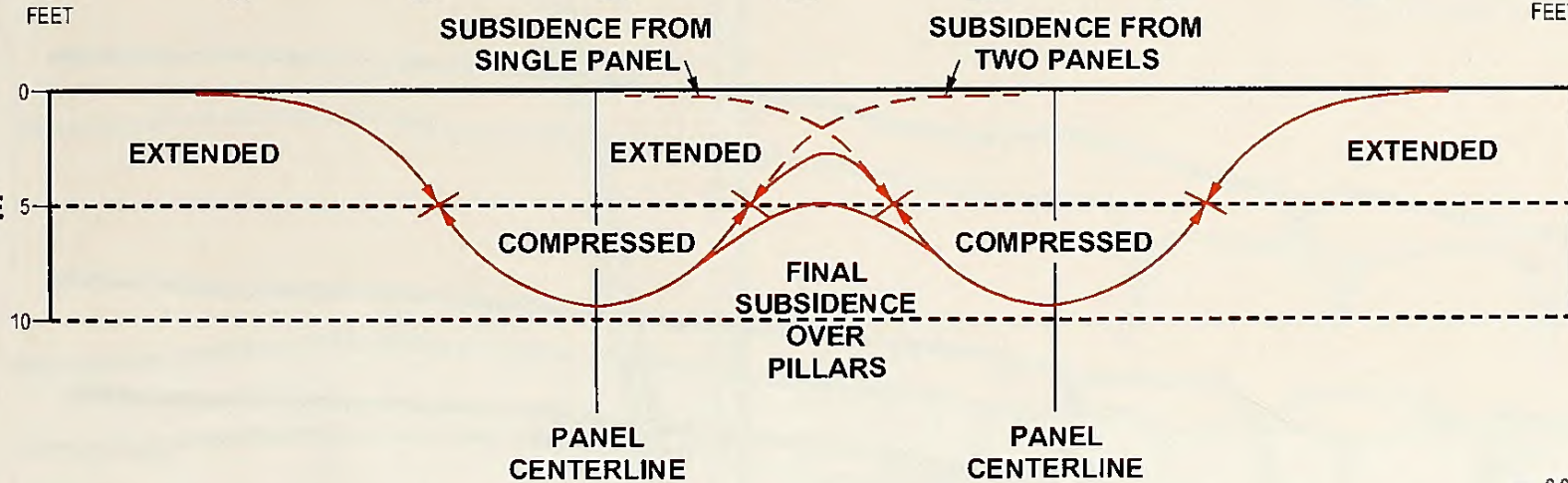


North Fork Coal DRAFT EIS
FIGURE F-4
CONCEPTUAL REPRESENTATION OF SUBSIDENCE DEFORMATION ZONES

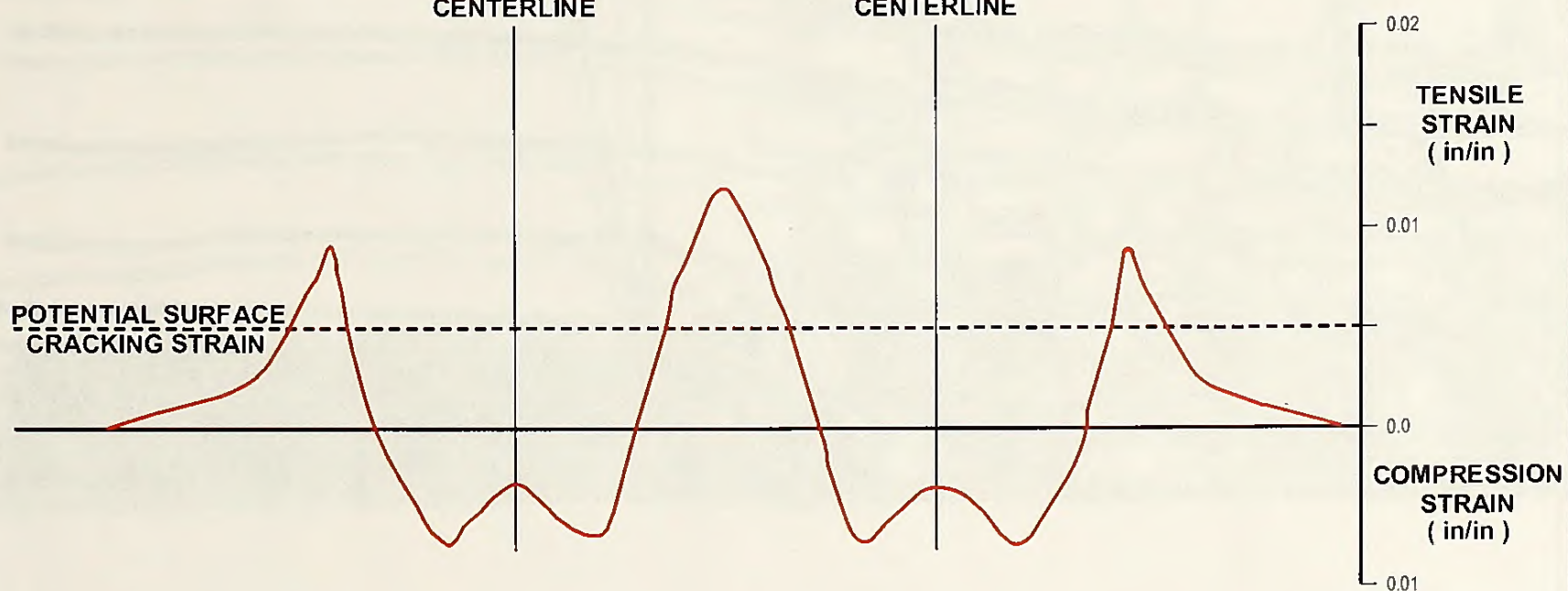
(A)
OVERBURDEN
DEPTH
(FEET)



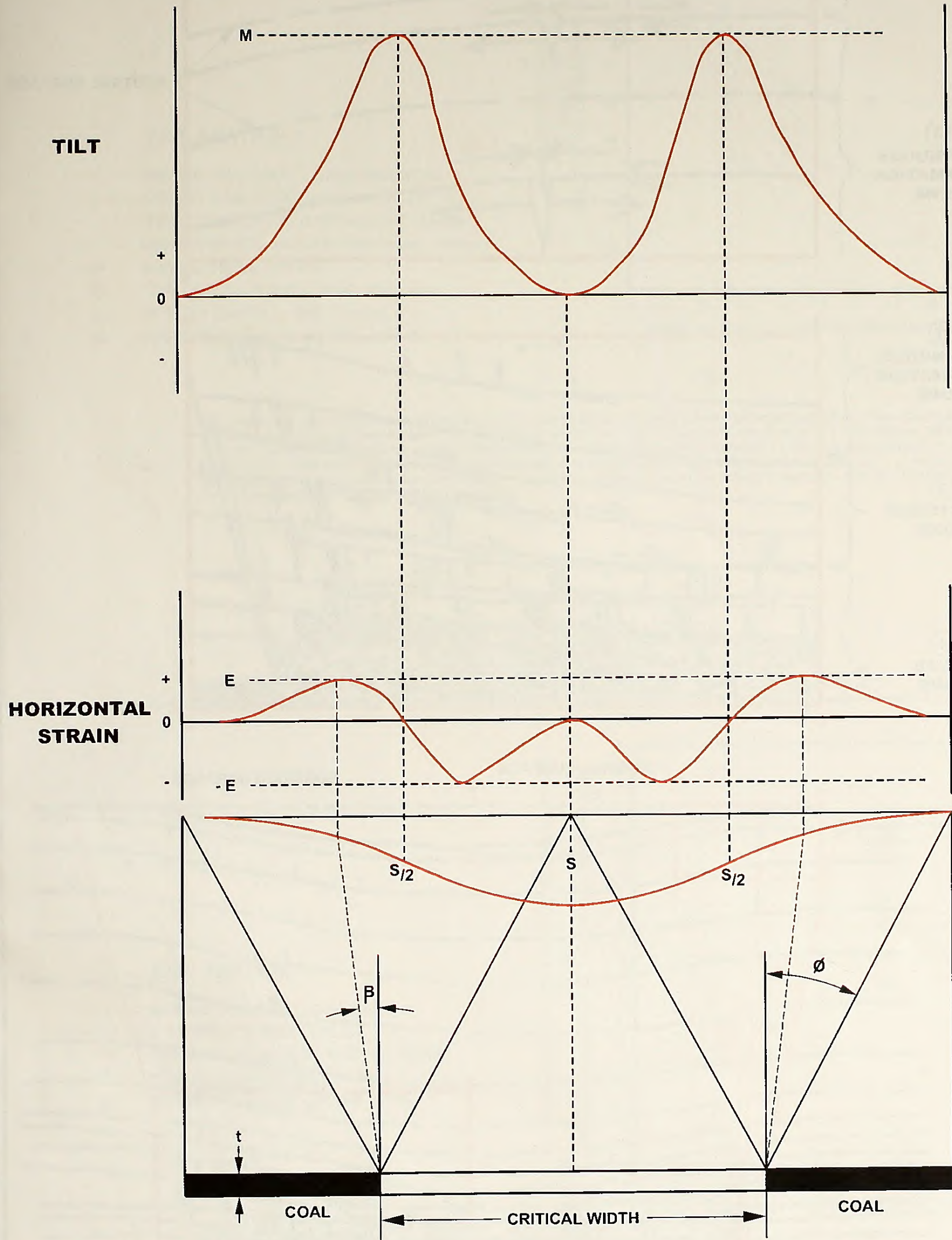
(B)
SUBSIDENCE
(FEET)



(C)
STRAIN

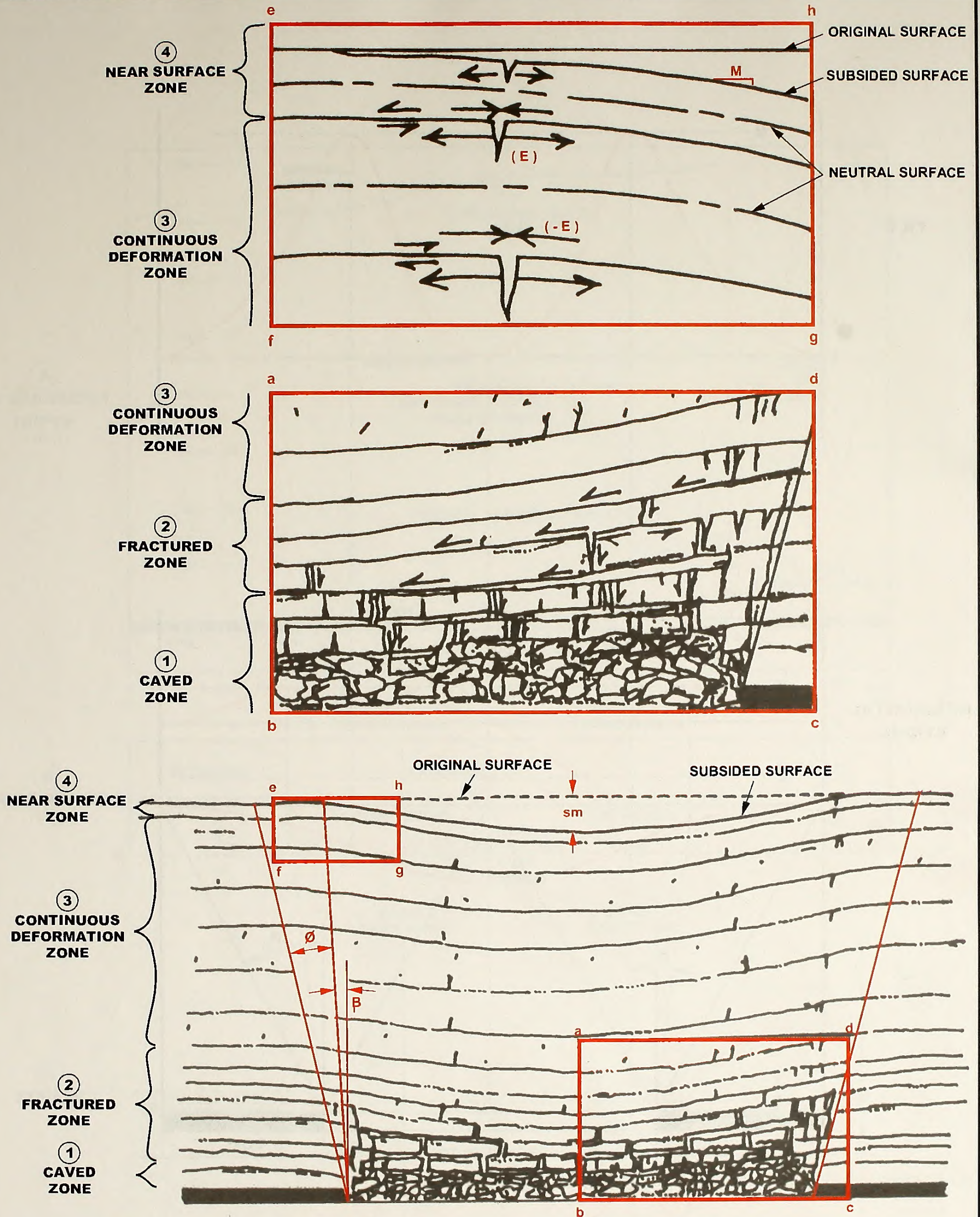


North Fork Coal DRAFT EIS
FIGURE F-5
EXAMPLE OF SUBSIDENCE STRAIN PROFILES



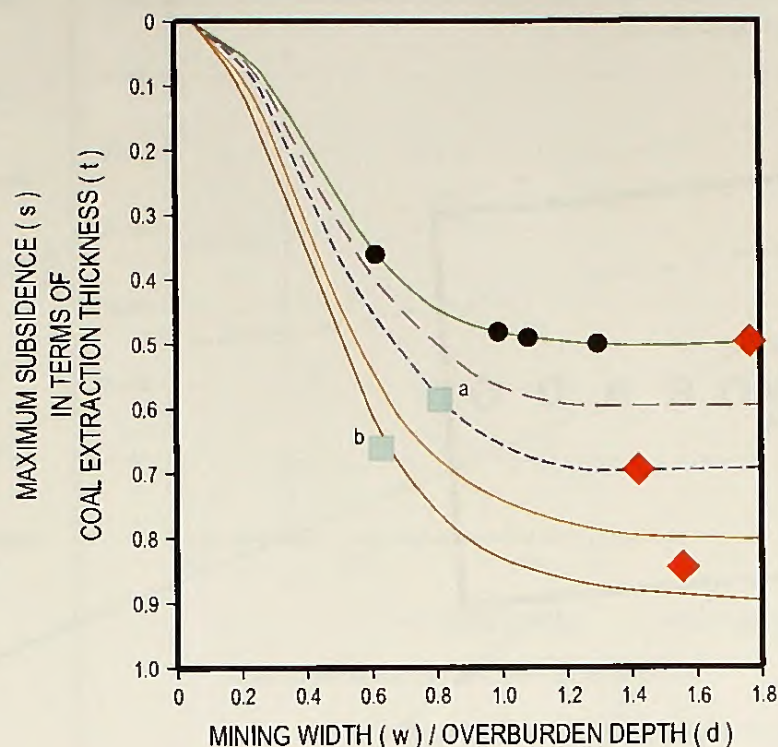
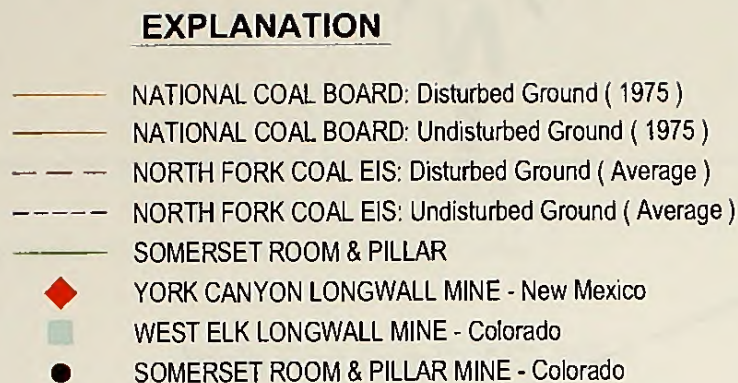
Conceptual diagram showing a typical subsidence profile and related parameters for a longwall mining panel of critical width. Parameters discussed in the North Fork Coal EIS Lease Tracts are maximum vertical displacement (S), tilt (M), strain (E), draw angle (limit angle) (ϕ), break angle (β), and t (thickness of coal extracted).

North Fork Coal DRAFT EIS
FIGURE K-1
TYPICAL SUBSIDENCE PROFILE FOR LONGWALL



Conceptual cross section showing a typical subsidence process shortly after longwall mining (i.e. in dynamic state); the four zones of subsidence typical of the Somerset - Paonia area are shown. Enlargement a, b, c, d indicates possible avenues of water flow in the caved and fractured zone; e, f, g, h shows tilt (M) and strain ($E, -E$) in the continuous deformation and near-surface zones.

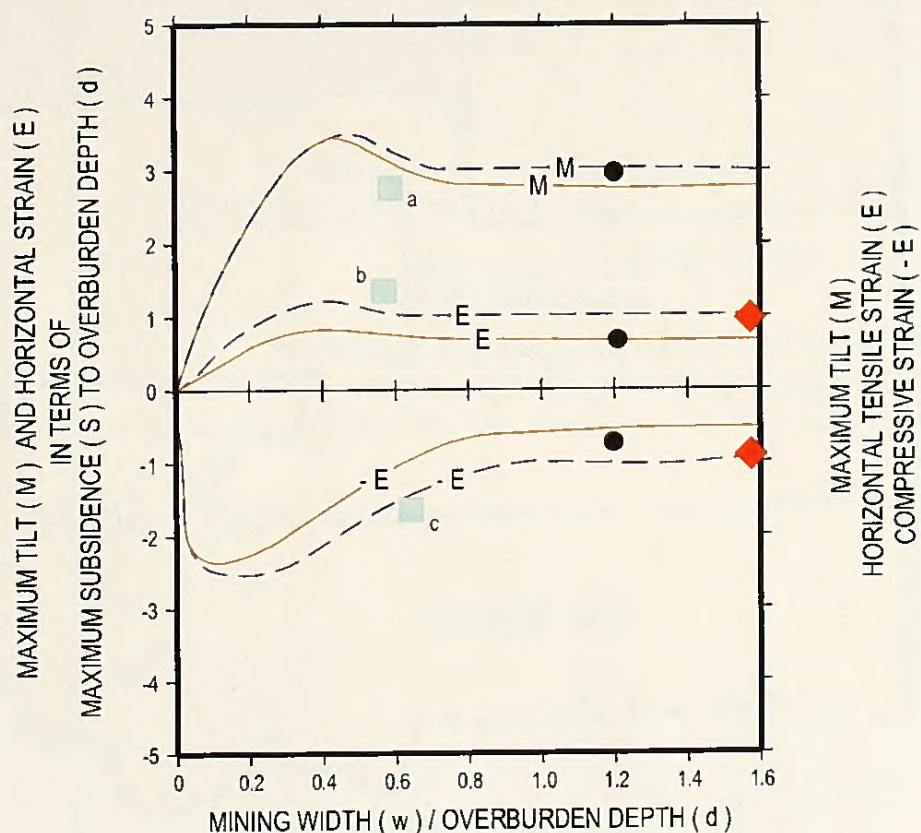
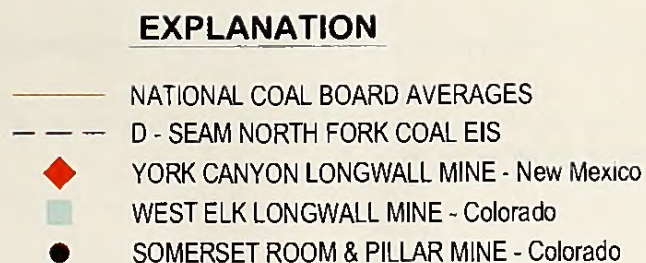
North Fork Coal DRAFT EIS
FIGURE K-2
TYPICAL LONGWALL SUBSIDENCE CROSS SECTION



Graph showing maximum vertical displacement (commonly called maximum subsidence) (S) values in terms of coal extraction thickness (t) versus the ratio of mining curves from the National Coal Board in undisturbed ground (U.G.) and disturbed ground (D.G.). Points in circles are from the Somerset room - and - pillar mine. Points in diamonds are from the York Canyon longwall mine in undisturbed ground in the New Mexico (Gentry and Abel, 1978) measured in a valley (upper point), on a ridge (lower point), and an average value (middle point). Squares are from the West Elk longwall mine: a, average in disturbed ground with subdued, rolling topography; b, in disturbed ground on steep ridge; data used with permission from Mountain Coal Company. Long - and - short - dashed curves represents projected average values for the North Fork Coal EIS Lease Tracts in undisturbed ground (U.G.) and disturbed ground (D.G.).

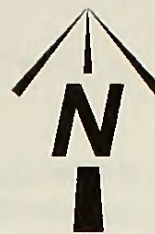
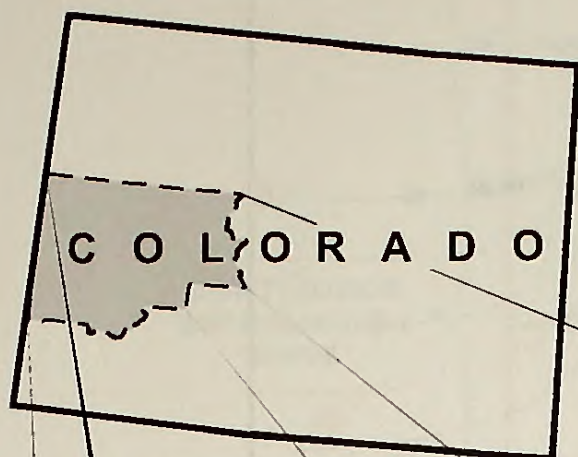
North Fork Coal DRAFT EIS FIGURE K-3

MAXIMUM VERTICAL DISPLACEMENT FOR LONGWALL

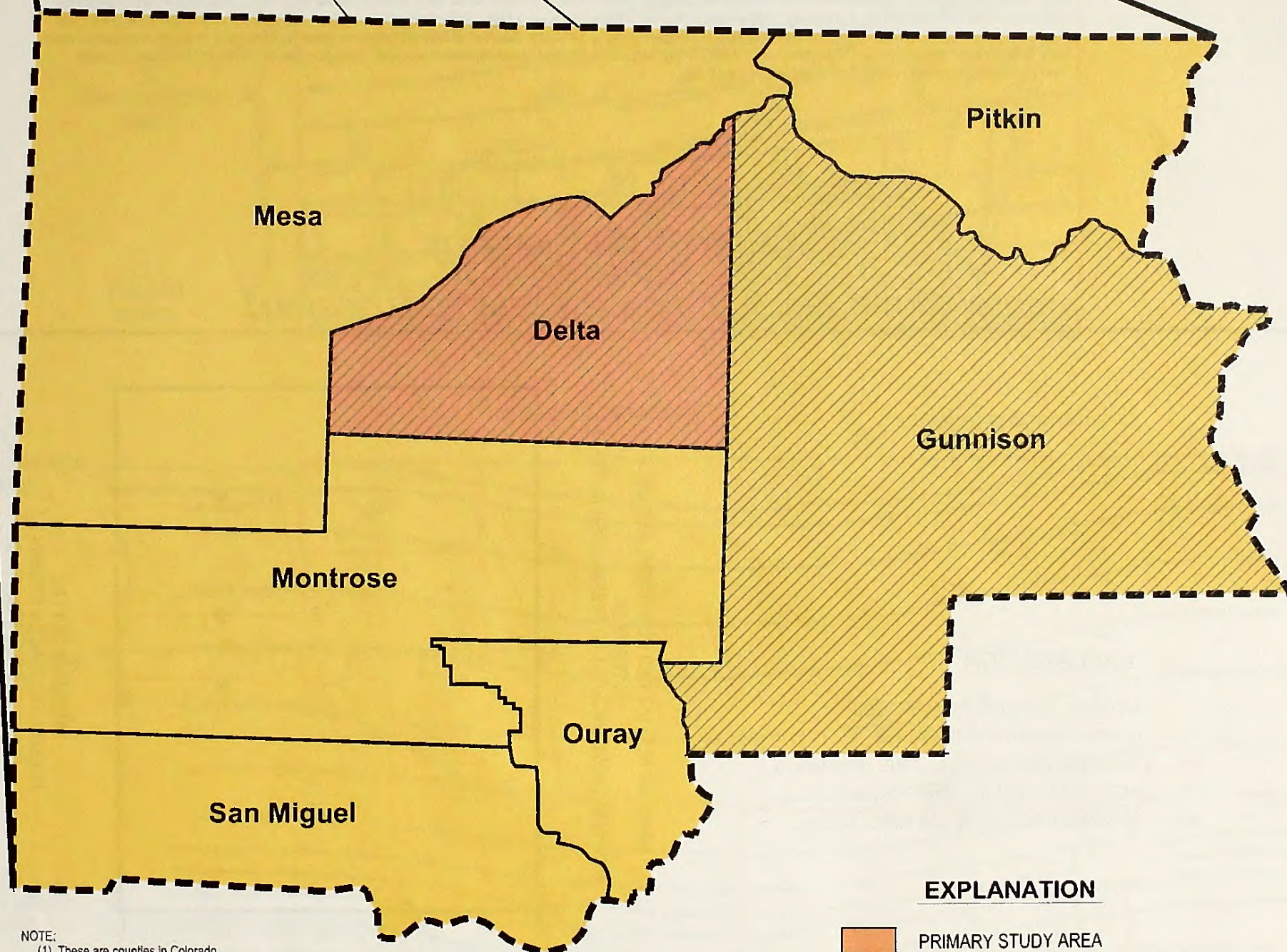


Maximum tilt (M) and horizontal tensile strain (E) and compressive strain (-E), in terms of S/d versus the ratio of mining width (W) to overburden depth (d). Solid lines are from NCB averages; circles are from the Somerset room - and - pillar mine; diamonds are average values from the York Canyon longwall mine, New Mexico. Squares are average values from the West Elk longwall mine: a, average tilt; b, average horizontal tensile strain at panel boundaries; c, average horizontal compressive strain; data used with permission from Mountain Coal Company. Dashed line is the projected average for mining the D - seam in the North Fork Coal EIS Lease Tracts.

North Fork Coal DRAFT EIS FIGURE K-4 TILT AND STRAIN






Not To Scale

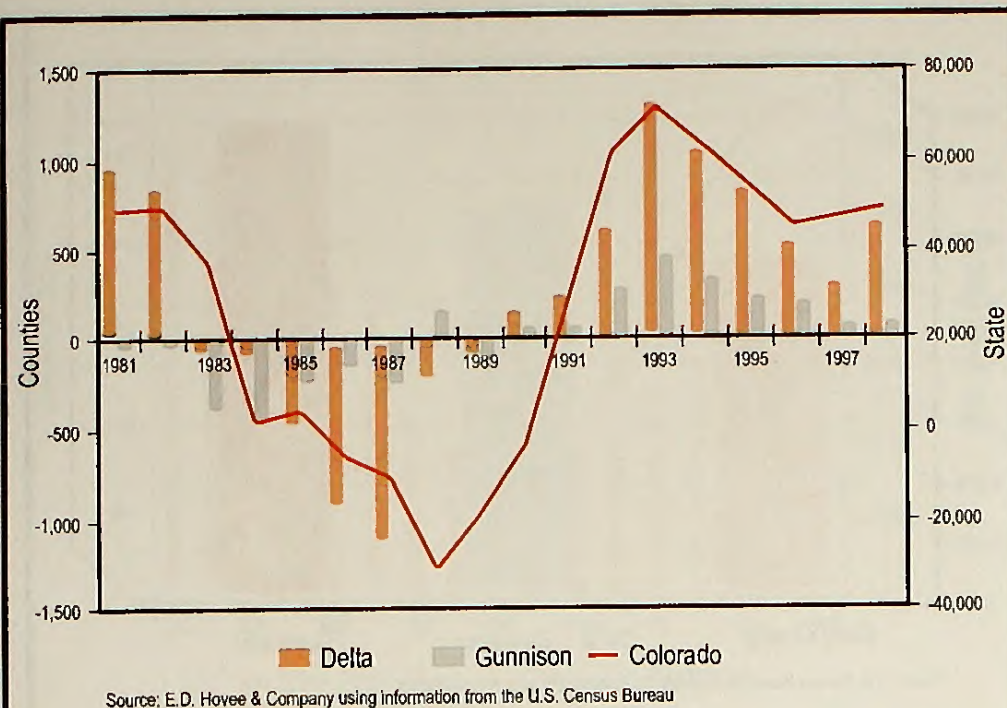


NOTE:
(1). These are counties in Colorado

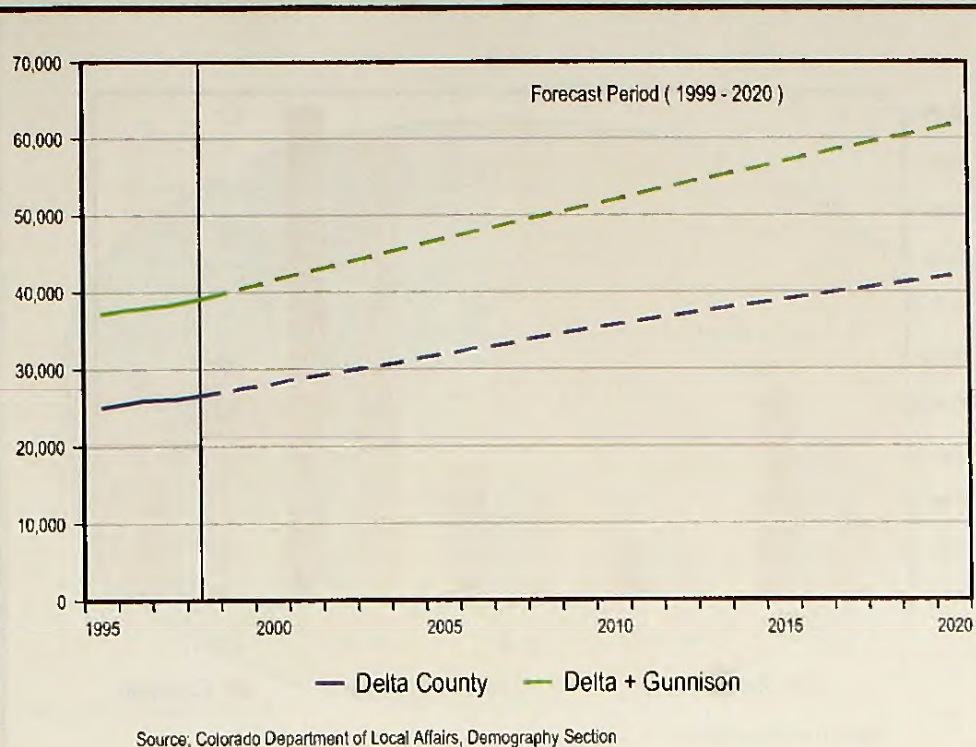
EXPLANATION

-  PRIMARY STUDY AREA
-  SECONDARY STUDY AREA
-  BOUNDARY OF TERTIARY STUDY AREA

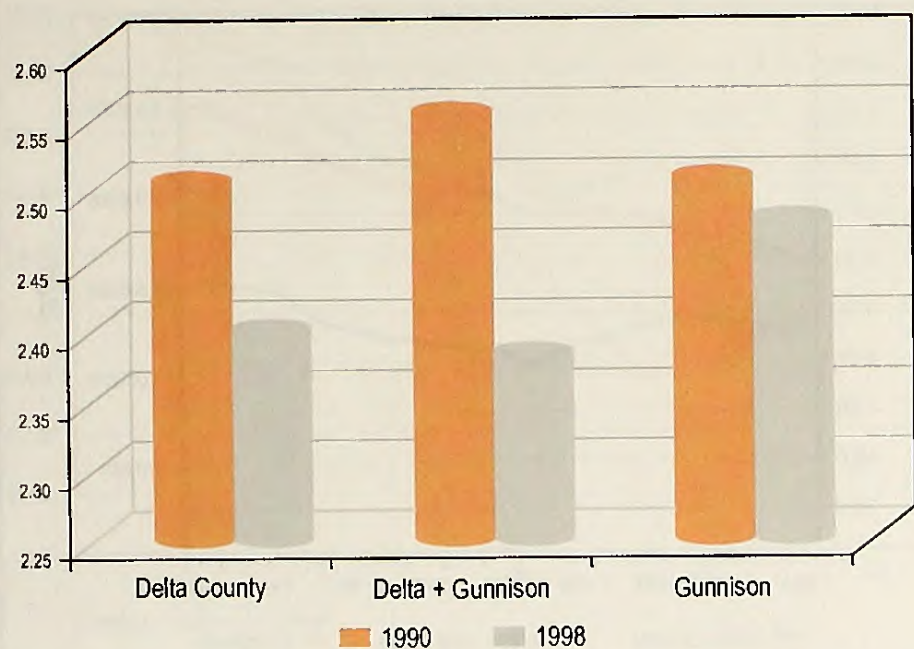
North Fork Coal DRAFT EIS
FIGURE L1
SOCIOECONOMIC STUDY AREAS



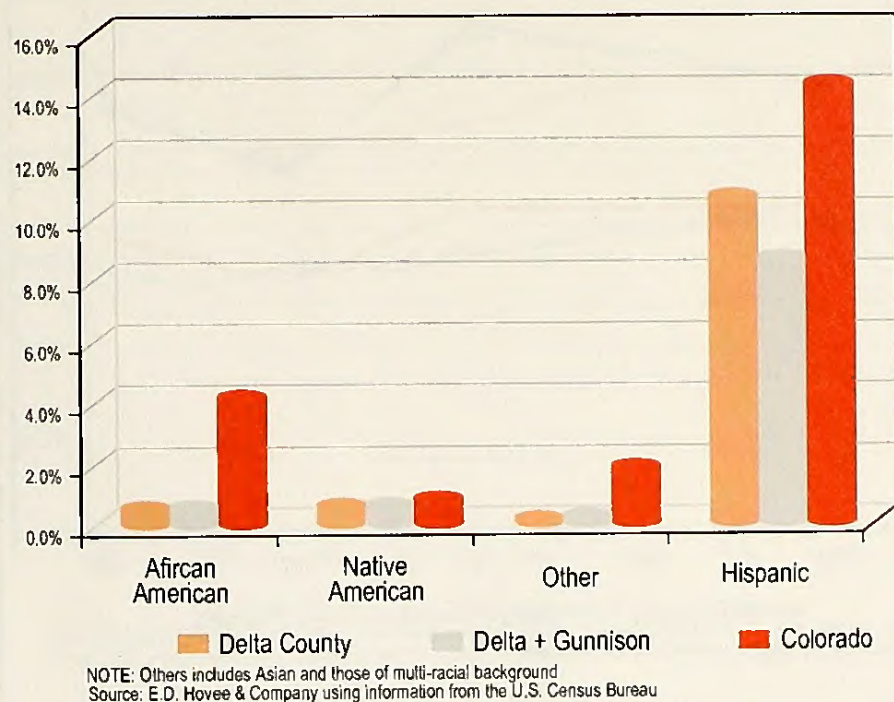
North Fork Coal DRAFT EIS
FIGURE L-2
NET MIGRATION TREND (1981 - 1998)



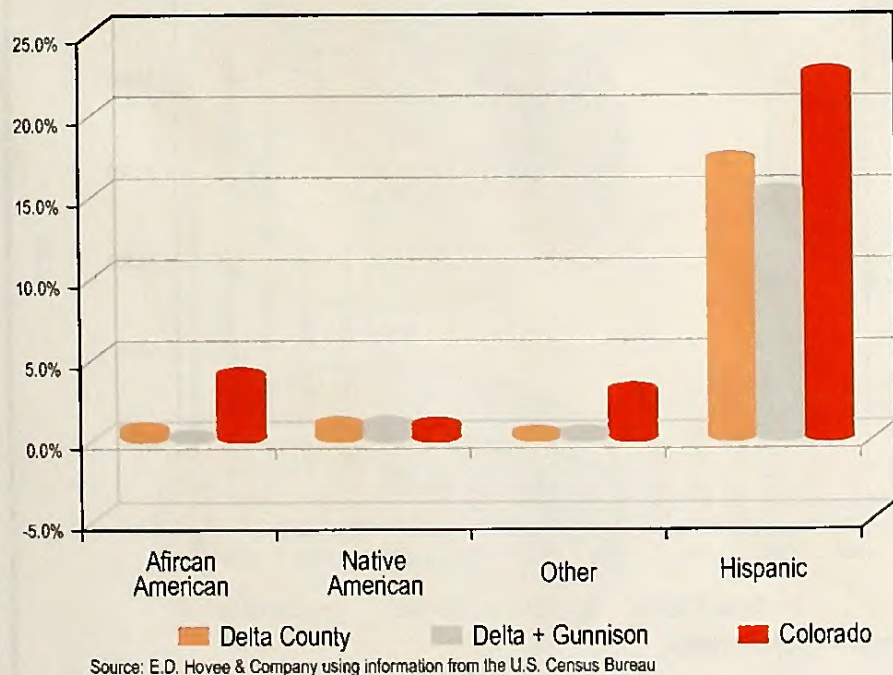
North Fork Coal DRAFT EIS
FIGURE L-3
POPULATION FORECAST (1995-2020)



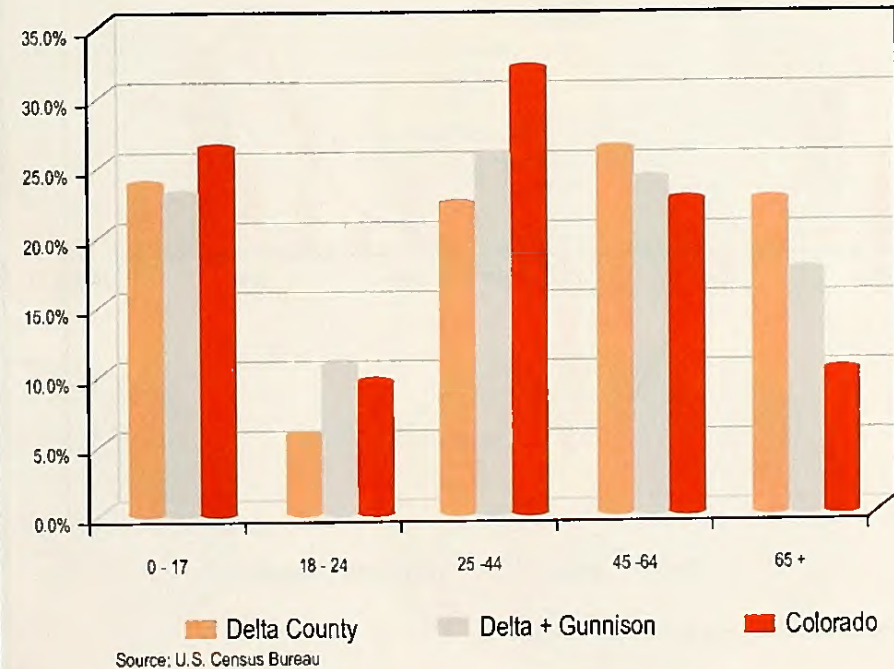
North Fork Coal DRAFT EIS
FIGURE L-4
CHANGES IN HOUSEHOLD SIZE (1990 - 1998)



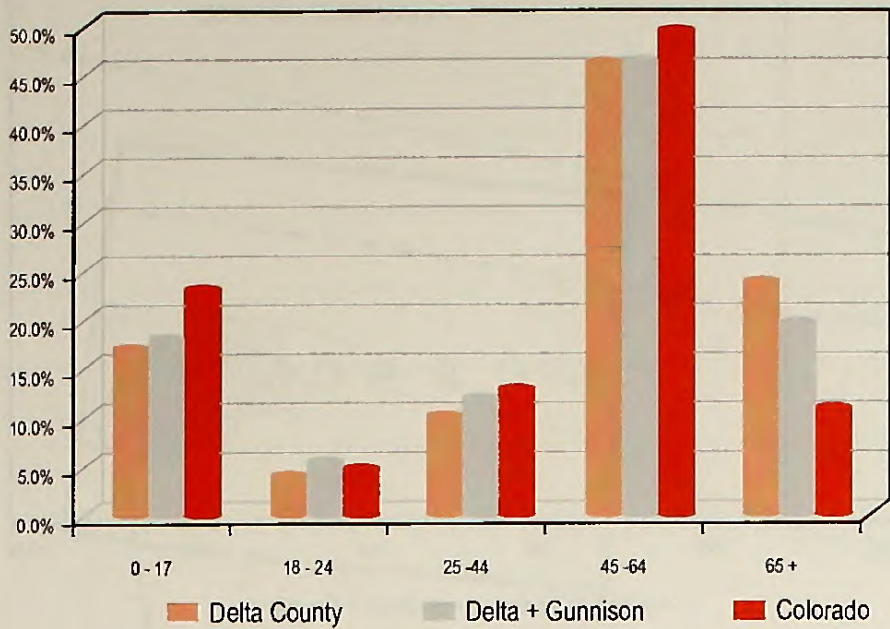
North Fork Coal DRAFT EIS
FIGURE L-5
ETHNIC BACKGROUND OF STUDY AREA POPULATIONS (1997)



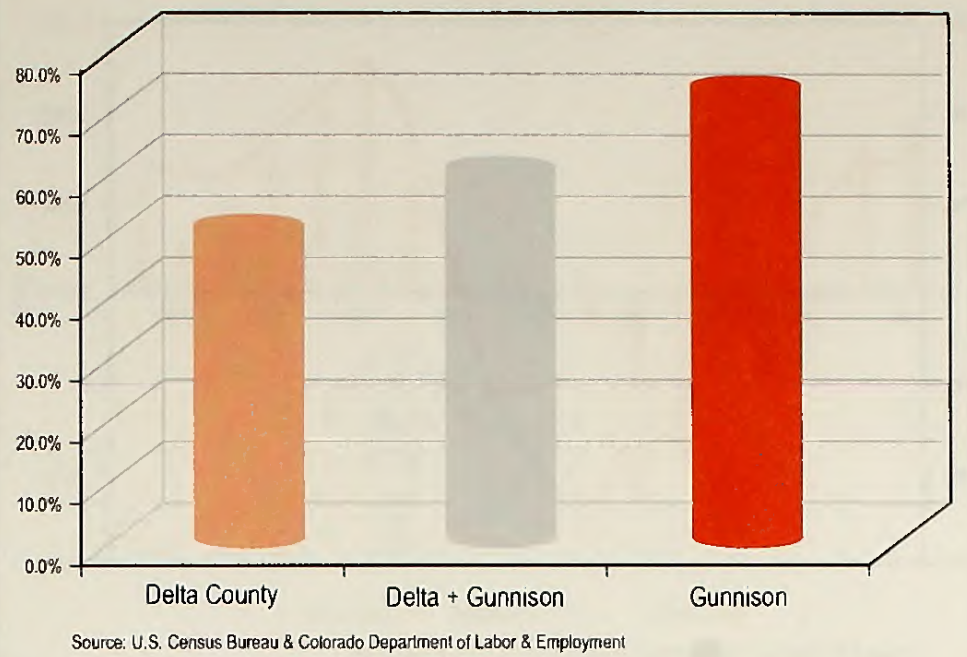
North Fork Coal DRAFT EIS
FIGURE L-6
CHANGE IN ETHNIC BACKGROUND OF STUDY AREA POPULATIONS (1990 - 1997)



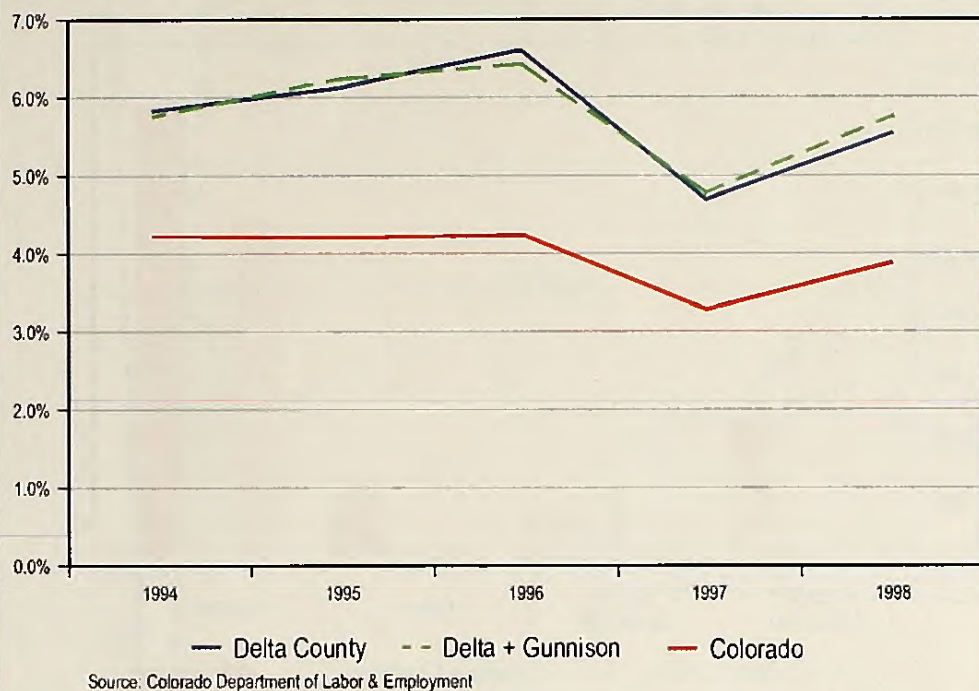
North Fork Coal DRAFT EIS
FIGURE L-7
POPULATION AGE CHARACTERISTICS (1997)



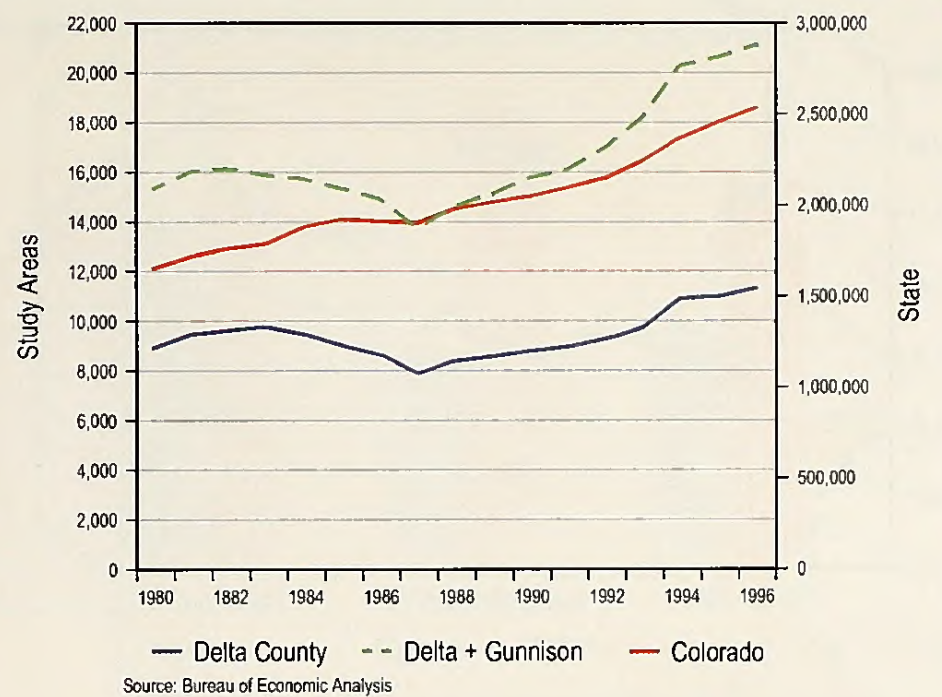
North Fork Coal DRAFT EIS
FIGURE L-8
CHANGES IN POPULATION
AGE CHARACTERISTICS (1990 - 1997)



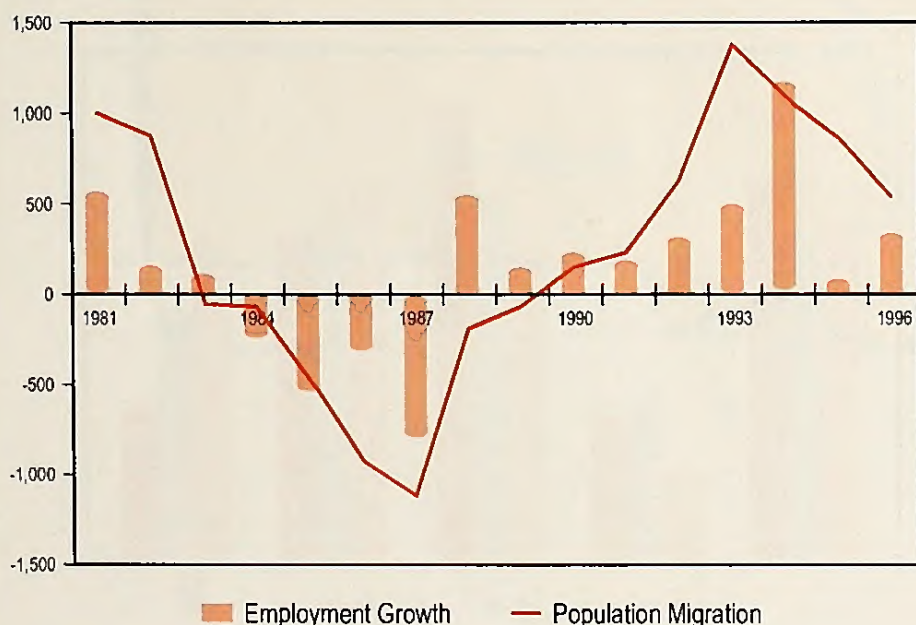
North Fork Coal DRAFT EIS
FIGURE L-9
LABOR FORCE PARTICIPATION RATE (1997)



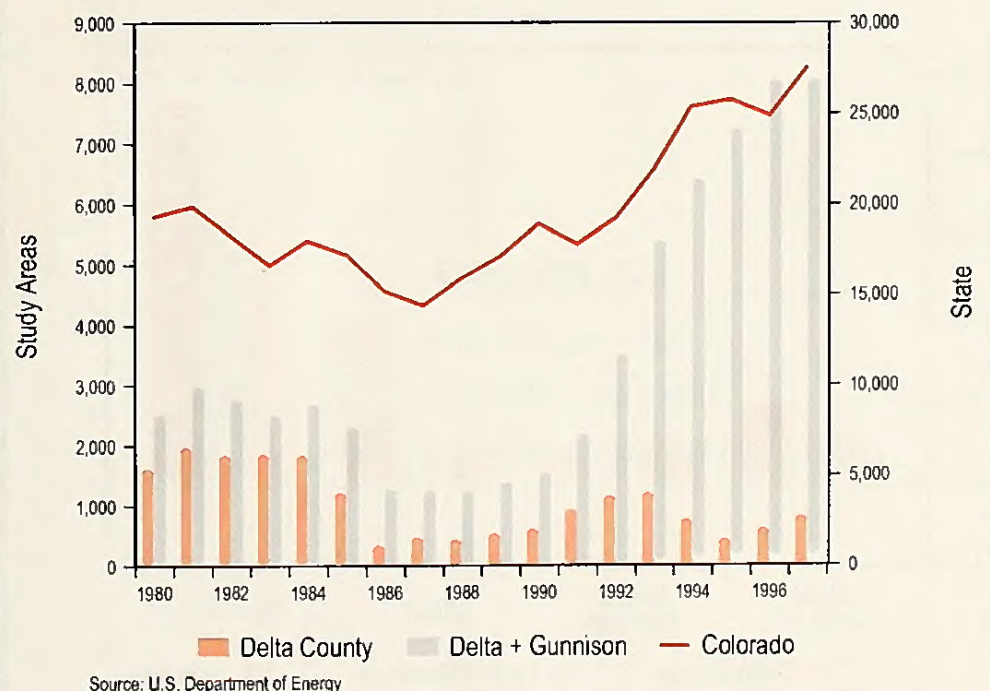
North Fork Coal DRAFT EIS
FIGURE L-10
UNEMPLOYMENT RATE TRENDS



North Fork Coal DRAFT EIS
FIGURE L-11
TOTAL EMPLOYMENT TRENDS
(PART & FULL- TIME EMPLOYEES)



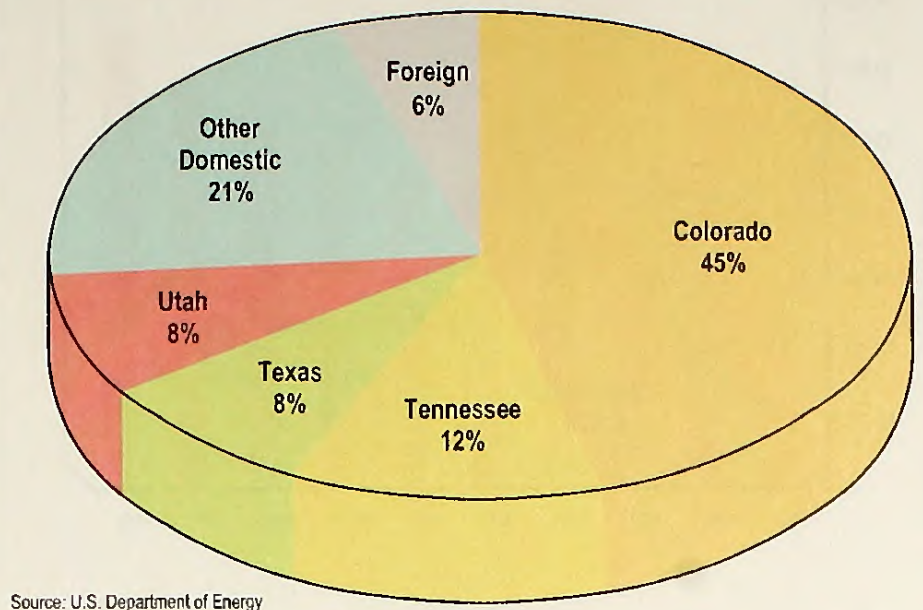
North Fork Coal DRAFT EIS
FIGURE L-12
DELTA COUNTY EMPLOYMENT
GROWTH & POPULATION MIGRATION TRENDS



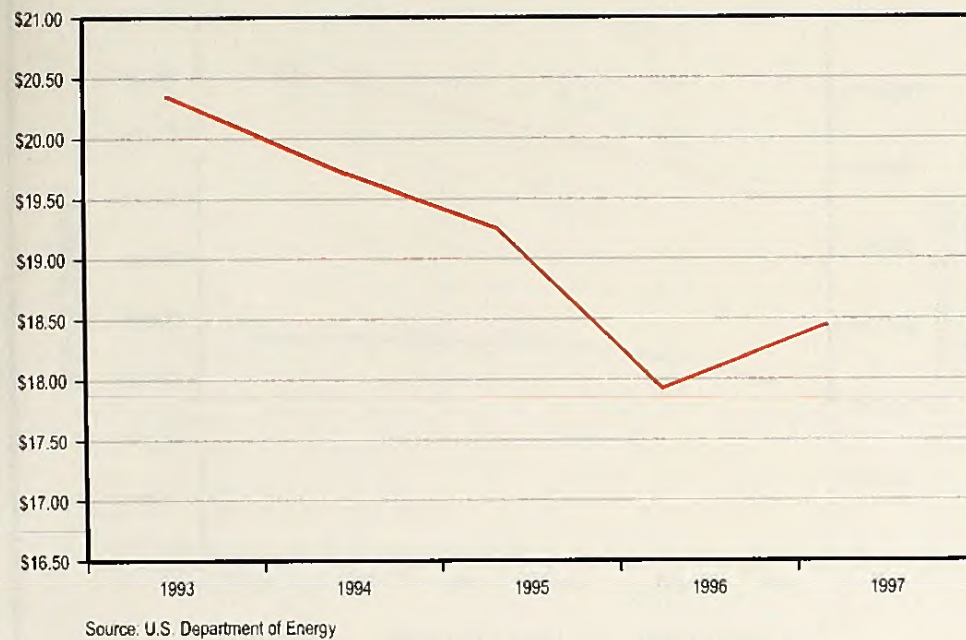
North Fork Coal DRAFT EIS
FIGURE L-13
COAL PRODUCTION TRENDS
(1000s Short Tons)



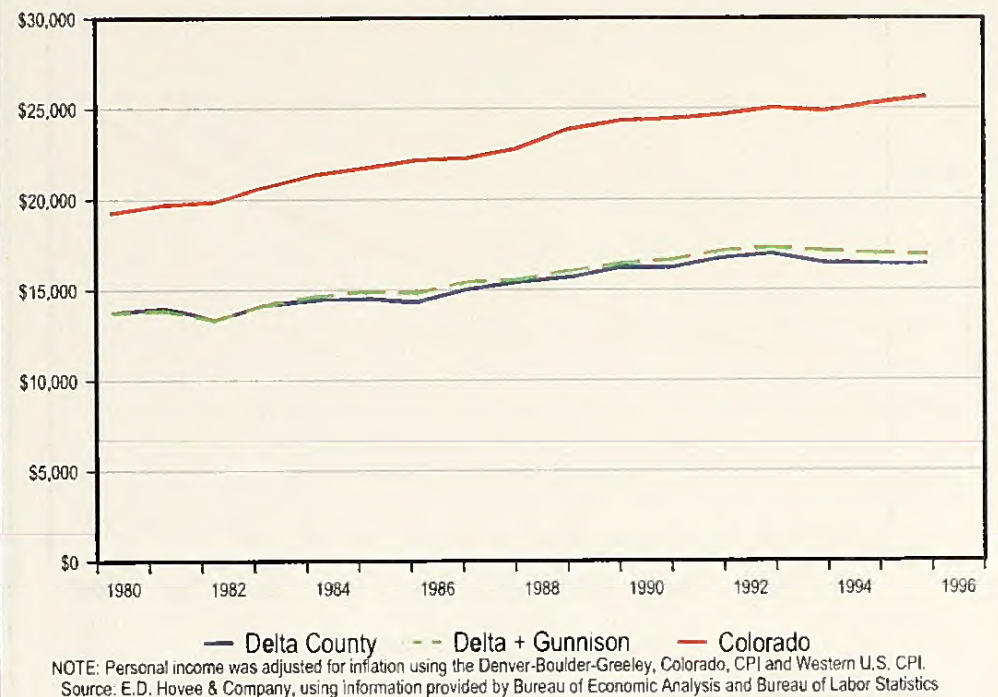
North Fork Coal DRAFT EIS
FIGURE L-14
COAL MINING PRODUCTIVITY TRENDS IN DELTA & GUNNISON COUNTIES (1000s Short Tons)



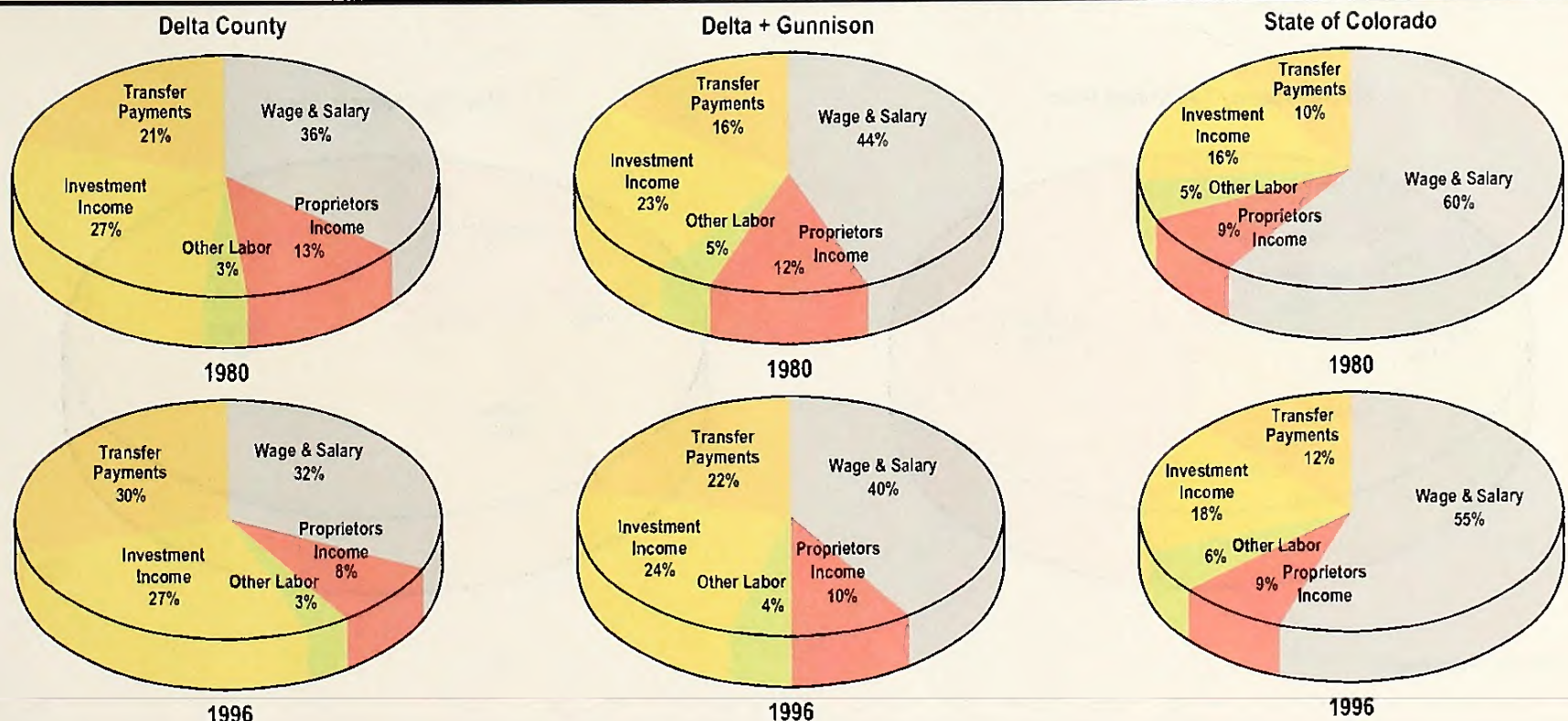
North Fork Coal DRAFT EIS
FIGURE L-15
DISTRIBUTION OF COLORADO COAL SALES (1997)



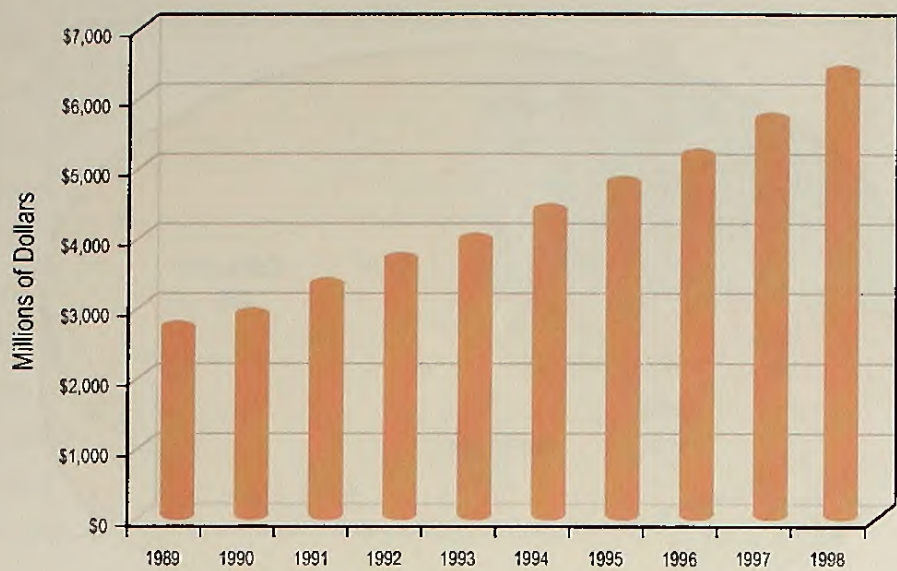
North Fork Coal DRAFT EIS
FIGURE L-16
AVERAGE MINE PRICE OF COLORADO COAL



North Fork Coal DRAFT EIS
FIGURE L-17
TOTAL PERSONAL INCOME PER CAPITA (Inflation Adjusted)

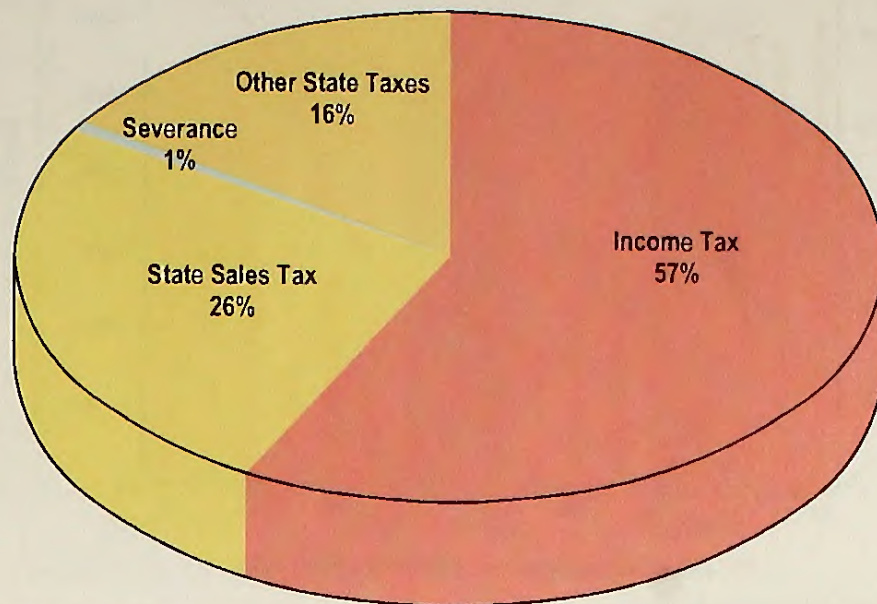


North Fork Coal DRAFT EIS
FIGURE L-18
SOURCES OF PERSONAL INCOME



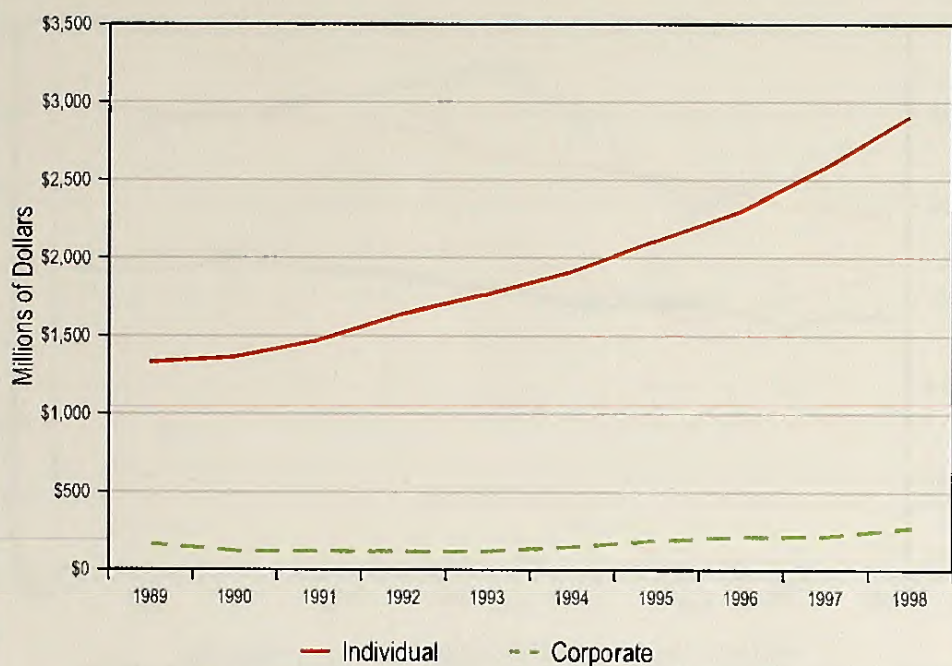
Source: Colorado Department of Revenue

North Fork Coal DRAFT EIS
FIGURE L-19
NET STATE & LOCAL REVENUE COLLECTIONS



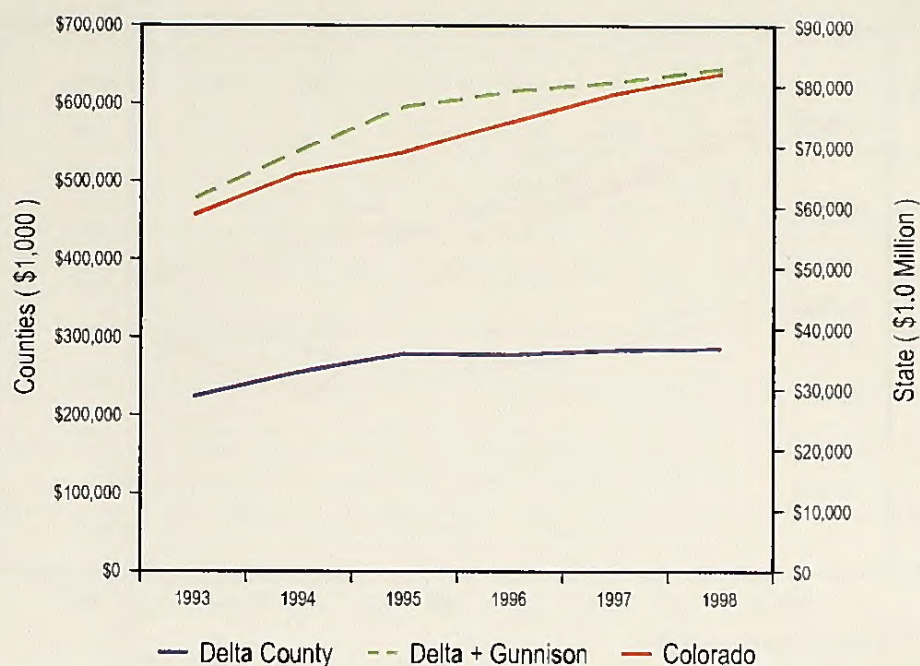
Source: Colorado Department of Revenue

North Fork Coal DRAFT EIS
FIGURE L-20
MAJOR SOURCE OF COLORADO
STATE TAX COLLECTIONS (1998)



Source: Colorado Department of Revenue

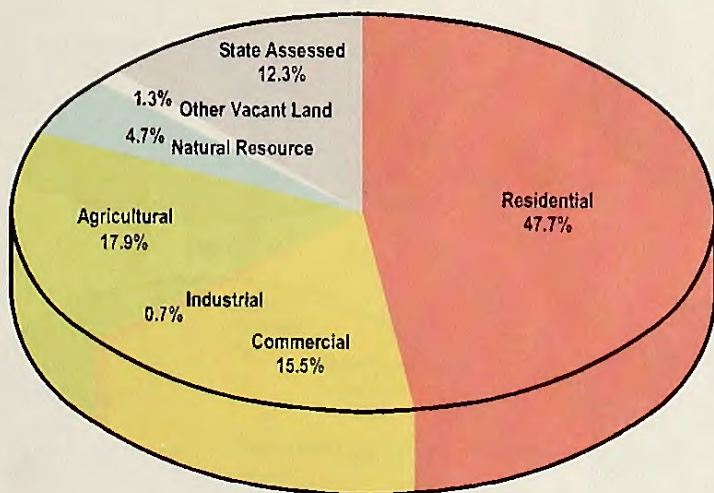
North Fork Coal DRAFT EIS
FIGURE L-21
STATE INCOME TAX COLLECTIONS
(1989 TO 1998)



Source: Colorado Department of Revenue

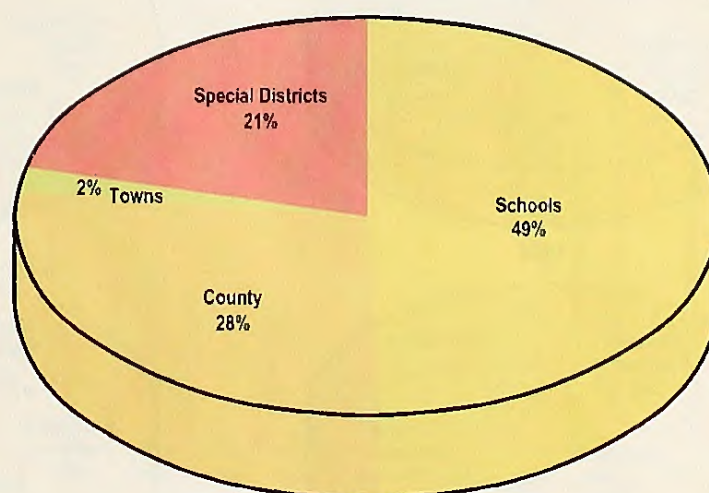
North Fork Coal DRAFT EIS
FIGURE L-22
RETAIL SALES TRENDS
(1993 - 1998)

Where Property Tax Comes From

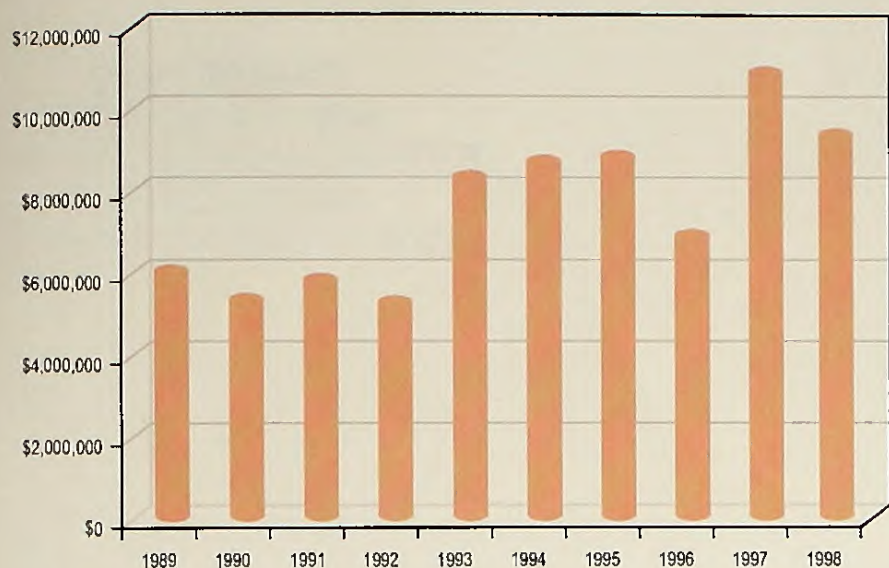


Source: Delta County Assessor

How Tax Dollar is Spent

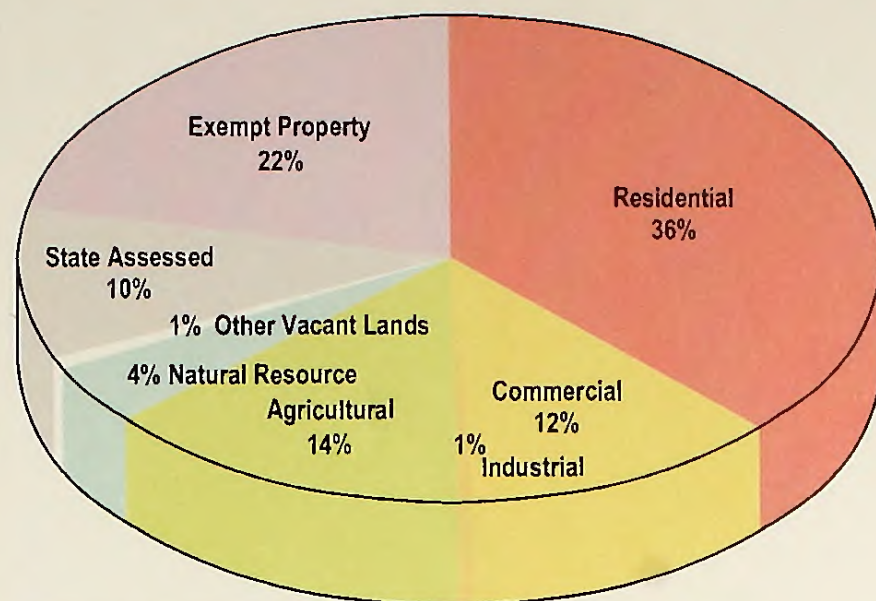


North Fork Coal DRAFT EIS
FIGURE L-23
1998 DELTA COUNTY PROPERTY TAXES



Source: Colorado Department of Revenue

**North Fork Coal DRAFT EIS
FIGURE L-24
STATE COAL SEVERANCE TAX TRENDS
(1989 - 1998)**



Source: Delta County Assessor

**North Fork Coal DRAFT EIS
FIGURE L-25
DELTA COUNTY ASSESSED VALUES
(1998)**

BLM LIBRARY
BLDG 50, ST-160A
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, COLORADO 80225



**Third Party Contractor
S Edwards Inc.**